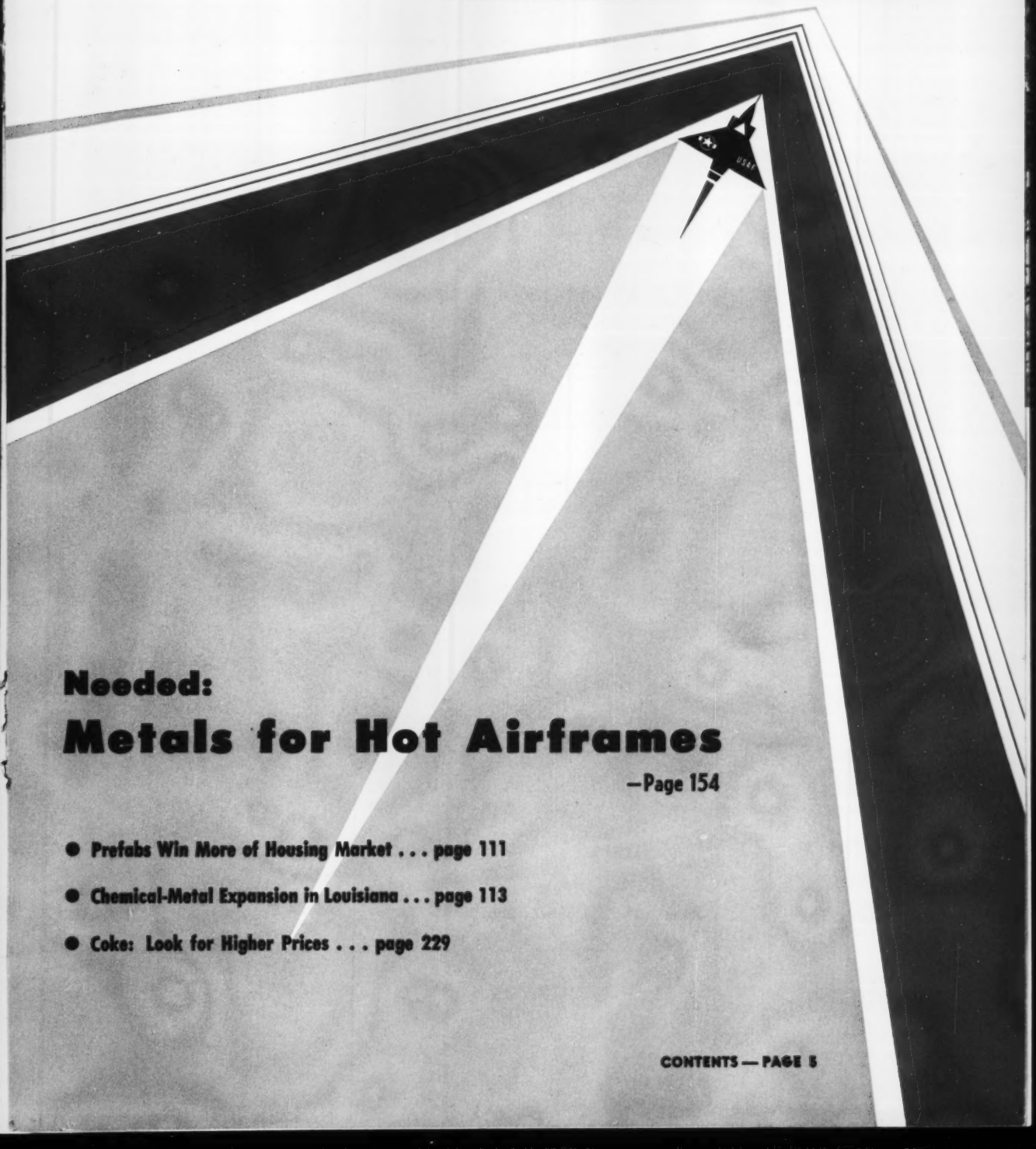
MARCH 11, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Needed:

Metals for Hot Airframes

—Page 154

- Prefabs Win More of Housing Market . . . page 111
- Chemical-Metal Expansion in Louisiana . . . page 113
- Coke: Look for Higher Prices . . . page 229

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MORE from Allis-Chalmers—

Dependable Power for Industry

APPLY the many cost-saving features of Allis-Chalmers deep-rib motors in a variety of plant uses whatever your product or process.

Here's why these motors offer more dependability in industry after industry:

MORE Cooling Surface — Rib-type design provides reserve cooling capacity in dirty locations.

MORE Iron — Cast-iron frame and external parts assure greater rigidity and resistance to corrosion.

MORE Copper — Greater use of copper provides top electrical performance.

MORE Lubrication Provisions — Large grease reservoirs surround bearings. Provision made for in-service relubrication — important where moisture or corrosive vapors may contaminate grease.

Rib-Type MOTORS 1 to 100 hp

Rib construction is available in Allis-Chalmers motors from 1 to 100 hp. As a new machinery component or as replacement, specify Allis-Chalmers. Contact your A-C district office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

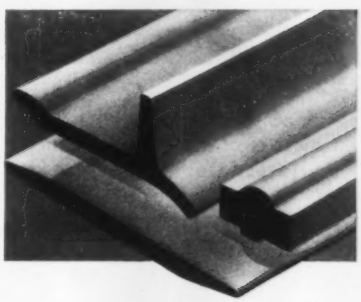
A-5317

Another job for special sections

This heavy construction team consists of a D7 tractor and No. 70 scraper, both manufactured by Caterpillar Tractor Co. Though not evident to the eye, Bethlehem special sections are also a part of this team, proving once again their value in a thousand and one applications.

Take those deep-biting grouser shoes on the tractor. We roll them to Caterpillar's designs and specifications, with the customer's name rolled right into the steel.

The power of the D7 tractor's diesel engine is delivered through a heavy-duty universal joint that is supplied by the Mechanics Universal Joint Division of Borg-Warner Corporation. This joint, in turn, is equipped with trunnion bearings made from Bethlehem special sections. Hot-rolled to the required dimensions, and supplied in bar lengths, the sections are finish-machined economically on the customer's multiple-spindle bar automatics.



Finally, the scraper blade itself is a special section. Rolling in the bevels is by far the most economical way to produce these blades.

Other heavy equipment parts frequently made from special sections are structural framing members, push arms and parts for various engine and drive assemblies.

But there's no end to the versatility of Bethlehem special sections. They're used in typewriters, pianos and lawn mowers; in railroad cars, steel grating and automobile hinges. How about *your* products—could you make them better, faster, more economically with hot-rolled special sections? We'd like to talk it over with you. Just call or write the Bethlehem district sales office nearest you.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

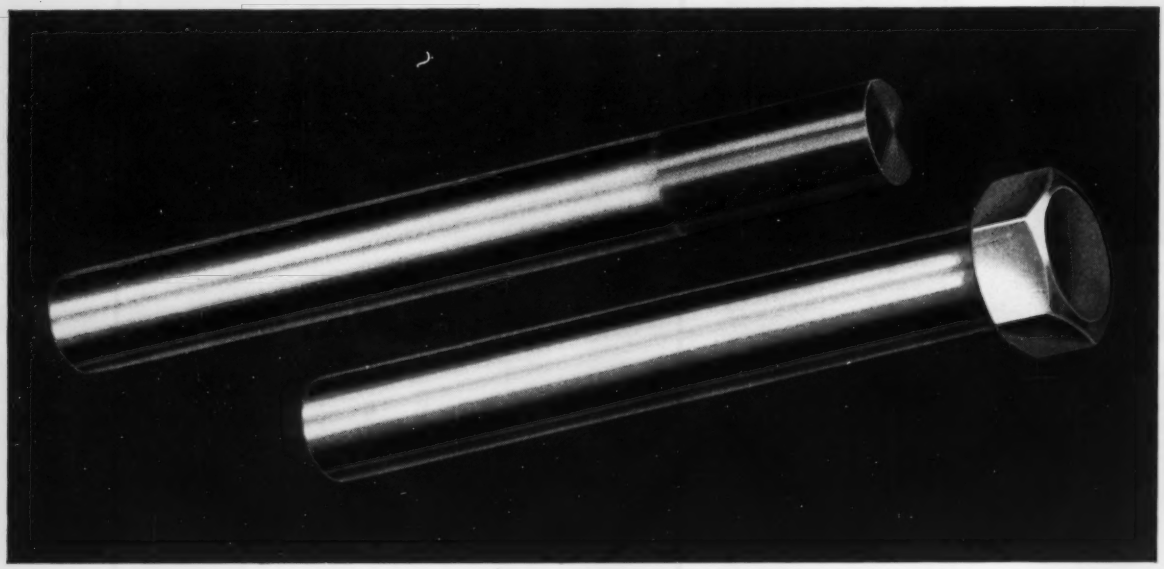
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Die Life Increased Up To 400%

with TOCCO* *Induction Heating*



● Naval Bronze, Silicon Bronze, Copper, Aluminum, Monel and all types of stainless steel are heated for forging at the H. M. Harper Co., Morton Grove, Illinois. Regardless of material TOCCO can be profitably applied to brazing, heat-treating and forging operations in almost any metal-working plant.

Production Up—In addition to the very important savings in forging dies, TOCCO has increased production to as much as 265% of output possible with former heating methods. On the 1″ type 303 Stainless machine bolt blanks shown here TOCCO upped production from 75 to 200 parts per hour, using 35 K. W., 10,000 cycles.

Versatile—The same TOCCO machine is used on stock of ⅜″ to 1¼″ diameter; heated zones vary from ½″ to 4″. TOCCO'S automatic timing cycles provide complete uniformity of heating throughout both length and cross section—assuring a uniformly high quality product.

Why not have a TOCCO Engineer investigate your plant to determine where TOCCO can cut your costs and streamline your production?

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—**NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept: S-3, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forming and Forging".

Name_____

Position_____

Company_____

Address_____

City_____ **Zone**____ **State**_____

Welding steel plate on a 300-ton open hearth ladle at the W. B. Pollock Company, Youngstown, Ohio.

We increased our fire insurance coverage 50% and cut premiums 69% with "Automatic" Sprinklers

...William B. Pollock Company

Here are the figures:

5-YEAR TOTAL PREMIUMS

Building and Contents — before Sprinklers	$40,214.00
Building and Contents — with "Automatic" Sprinklers and 50% added coverage	12,560.00
5-YEAR SAVINGS (*Without* sprinklers, premium with added coverage would have been $60,416.00)	**$ 27,654.00**
Business Interruption Insurance — without Sprinklers	$ 5,880.00
Business Interruption Insurance — with "Automatic" Sprinklers	1,520.00
5-YEAR SAVINGS	**$ 4,360.00**
TOTAL SAVINGS FOR 5-YEAR PERIOD	**$ 32,014.00**

(Cost of "Automatic" Sprinkler System $44,496.00)

"As manufacturers of heavy equipment for blast furnaces, steel mills, chemical and petroleum plants, our property is not ordinarily considered a "combustible occupancy." Yet, in our case it was highly desirable for us to protect our buildings and equipment and safeguard our continuity of production. This our "Automatic" Sprinklers will provide—plus returning the insurance savings shown.

"In addition, we have now taken out payroll insurance for our employees—to cover time lost in the event of a fire—at one-fourth the cost we would have had to pay without "Automatic" sprinklers. This also assures maintenance of our low rate for State Unemployment Compensation."

WANT MORE FACTS? Send for our Bulletin No. 66 "The ABC of Fire Protection" which tells you how "Automatic" Sprinkler Fire Protection can protect your plant—while reducing your insurance premiums and returning a profit.

"Automatic" Sprinkler

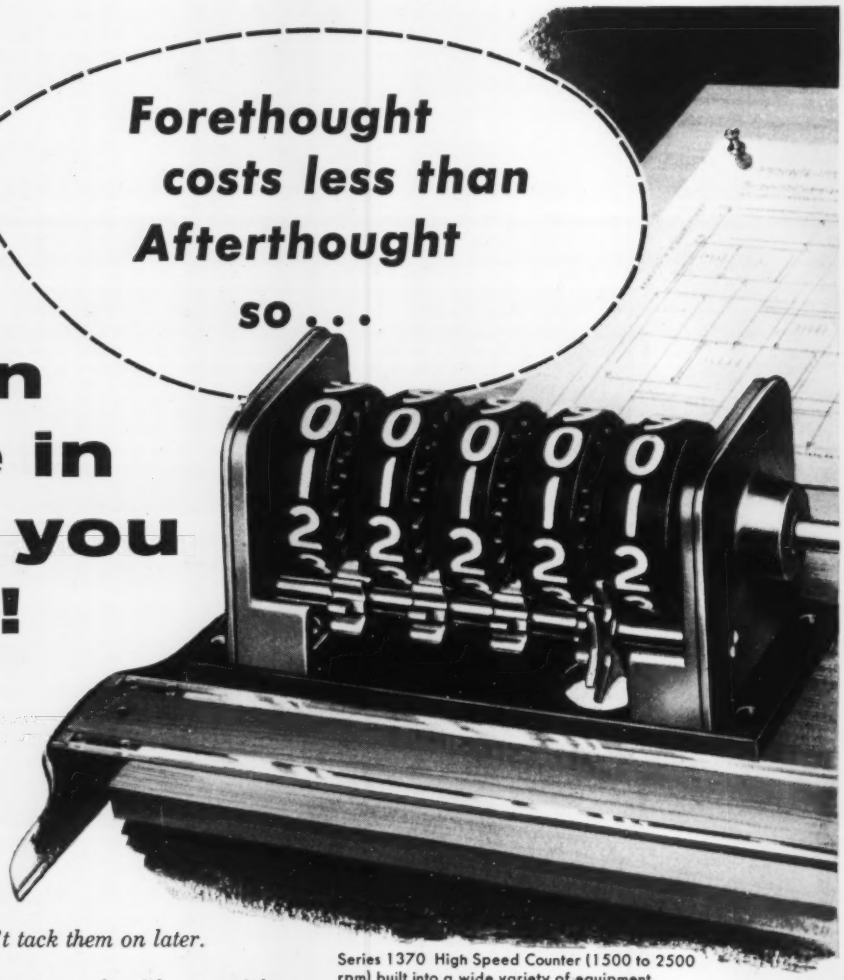
"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA

Dept. "S", YOUNGSTOWN 1, OHIO

OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

Forethought costs less than Afterthought so . . .

Design These in When you Begin!



Series 1370 High Speed Counter (1500 to 2500 rpm) built into a wide variety of equipment.

If you need mechanical or electrical counters in any of your new products, here's a word to the cost-wise designer: *Design them in, when you begin . . . don't tack them on later.*

For if you'll give us a chance to work with you, right from the beginning, chances are we can save you time and money by adapting or modifying a *standard* Veeder-Root Counter to your needs . . where you might get into a costly special job if you went about it alone. What's more, you save time in your engineering, purchasing and assembly departments.

Count on Veeder-Root to help you in every way . . . from design to delivery. Write:

Everyone... Can Count on Veeder-Root

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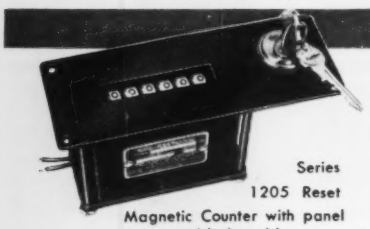
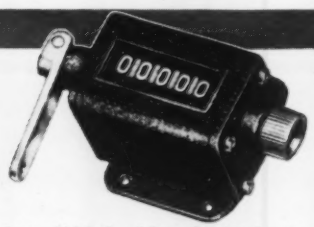


Series 1205 Reset Magnetic Counter with panel mount and lock and key.



Series 1122 Small Reset Ratchet Counter.

Special Longitude Counter, one of many made for aircraft navigational equipment.

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Metalworking Weekly

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Vol. 140 No. 10

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CONFIDENTIAL

PLANT LOCATION FACTS

on transportation costs

New York State has the most complete network of rail, water, highway and air routes in the world.

At your request we can determine the cost of assembling a given list of raw materials at any one or several locations within New York State. We will prepare cost and schedule data for the distribution of finished products from such locations to principal points of destination throughout the United States. The analysis can include movements by rail, water, highway or air or a combination of these forms of transportation.

Transportation won't be your only problem in deciding on a new plant location. You will want complete facts on labor, markets, water, available sites or buildings, power, fuel and raw materials. And you will want information on these as they apply to the successful operation of a specific plant.

A tailor-made report

Any or all of the factors important to your analysis will be covered in a confidential report to you—tailored to your needs. It will be prepared by a professional and experienced staff to cover either New York State locations of your choice, or, if you wish, sites which we will select on the basis of your needs.

Our booklet, "Industrial Location Services," explains what we can do for you. To get your free copy, write me at the New York State Department of Commerce, Room 675, 112 State Street, Albany 7, New York.

Edward T. Dickinson

EDWARD T. DICKINSON
COMMISSIONER OF COMMERCE

behind the scenes

Plan New Plane Skin

Once upon a time in Tura, Moravia (anybody around here remember Moravia?) there lived a little boy who thought a great deal about heat and velocity and sound. When he was old enough to understand what he was writing, he scribbled something that later inspired a bushy-haired old gentleman named Einstein to scribble something else, which instantly reduced gravitation to a kinematical phenomenon.

That little boy grew up to become a real hot shot in physics and psychology. His name was Ernest Mach, and the story that Technical Editor Dr. Al Gray has written ("Exploring the Thermal Barrier," page 154) is based on the problems stirred up by aircraft that exceed the speed of sound, and that's where Mach comes in. You see, Mach fooled around a lot with velocity, speed of sound and temperature; so when the fly boys wanted to express the idea of a plane moving at the speed of sound in altitudes where the temperature varied, they said it was Mach 1. At Mach 2 the velocity was doubled—and the heat increased, too. Contemporary aircraft fly at Mach 2.5, and this speed heats up their skin to about 600°F. Obviously, if they step up several more Mach numbers, the planes are likely to melt and return to earth in the form of showers of aluminum buckshot.

The story that Dr. Gray has assembled suggests that new aircraft have brought us to the threshold of a new metals age. Metalworking engineers everywhere are working on the problem of fabricating planes that won't melt in flight. So far titanium, stainless steels and die steels are being considered, as well as—but come, come! Let's not spoil Dr. Gray's story. You must read it for yourself.

Interoffice Memo

Certain changes in STEEL's staff have caused a revision in the editorial personnel listing on page 16. A new assistant editor, William Wallace, took up his duties in the home office Mar. 1. Bill is a graduate of Amherst College, and has had experience in advertising and sales, directory publishing and the Armed Forces of our beloved Republic. At the moment his only sartorial mark of distinction is a Tyrolean hat—and our only complaint is that we wish we were young enough to wear one, too.

Other movements within the family are the elevations of Associate Editor Van Caldwell to steel plant editor, and Associate Editor John R. Botzum to Washington editor. John D. Knox, who served for many years as steel plant editor, has been appointed consulting editor. In this capacity he will continue to give STEEL the benefit of his rich and varied experience.

John Botzum, a sharp graduate of the University of Akron, did postgraduate work at the University of Connecticut, and the fact that neither school has made any notable mark in the football world argues that they prize sheepskins above pigskins. John is a modest product of this unusual educational system; when he goes to Washington, with his wife Lynn and son Gar, he will find himself well qualified to peer, for STEEL's readers, through the Windows of Washington. James Morrissey, former Washington editor, has resigned. Botzum took over his new duties Mar. 1, so if you turn to the Windows page (page 118) you may check his performance.

Now It's Dominoes

There may be some argument about the Lloraporleche goats but the answer seems to be 135. The sloppy seagull required 10 4/5-days to cover 360 miles, and 24 bums, of course, were counted in the beer drinking party. Here's one that is contributed by an old lady who wishes to remain anonymous: In a domino set that runs up to double-six, there are 28 bones. In a set that runs up to double-nine, there are 55 bones. How many bones are there in a domino set that runs up to double-twelve?

Shrdlu

(Metalworking Outlook—Page 105)

How T&W Technique serves the off-the-highway truck industry better

At the right are two examples of the *special* results produced by *T & W Technique* to meet the particular needs of makers of off-the-highway trucks. T & W offers you a completely coordinated team of engineering and production facilities, to furnish forged or stamped parts or assemblies which usually cost you less at your point of assembly.

Write today for full information.

SALES OFFICES NEW YORK • PHILADELPHIA
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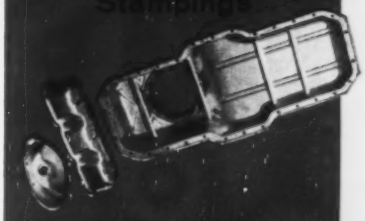
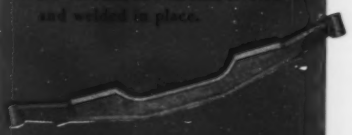
Forgings and Deep Drawn Stampings



Stampings for heavy trucks successfully produced by the wide range of Transue press equipment. Assembly operations completed by T & W include the sump ring, gasket flange reinforcements and baffles, riveted and welded in place.



Off-the-highway truck axle, weighing 400 lbs., forged from C-1050 steel, delivered to truck builder heat-treated and cleaned, ready for machining and final assembly.

FORGINGS AND DEEP DRAWN STAMPINGS

TRANSUE & WILLIAMS

Over 50 years of experience

ALLIANCE, OHIO—USA

HOW THE SLAYSMAN COMPANY REDUCED THREADING TIME BY 97%

The Slaysman Company, a large machine shop and parts sub-contractor in Baltimore, reduced threading time on one contract operation from 2 hours to 4 minutes by the installation of a LANDMACO Threading Machine.

This contract required the cutting of a 1" diameter 5 pitch Acme thread 29" long on C1141 steel to a Class 3 fit. Original production plans were to generate the thread by milling. At the same time, even though the specifications and the hardness of the material seemed to preclude other methods, we were asked if we could suggest a more efficient threading process.

Based on our recommendation after studying the thread specifications, a 1½" LANDMACO Single Head Leadscrew Machine with an extra-long carriage was installed. The LANCO threading head was equipped with centering throat chasers with a roughing and finishing thread form. Centering throat chasers produce threads concentric with the outside diameter, and eliminate the out-of-round condition that often occurs when threading extra-long workpieces. The roughing and finishing thread form chasers cut coarse pitch threads with excellent finish in one pass.

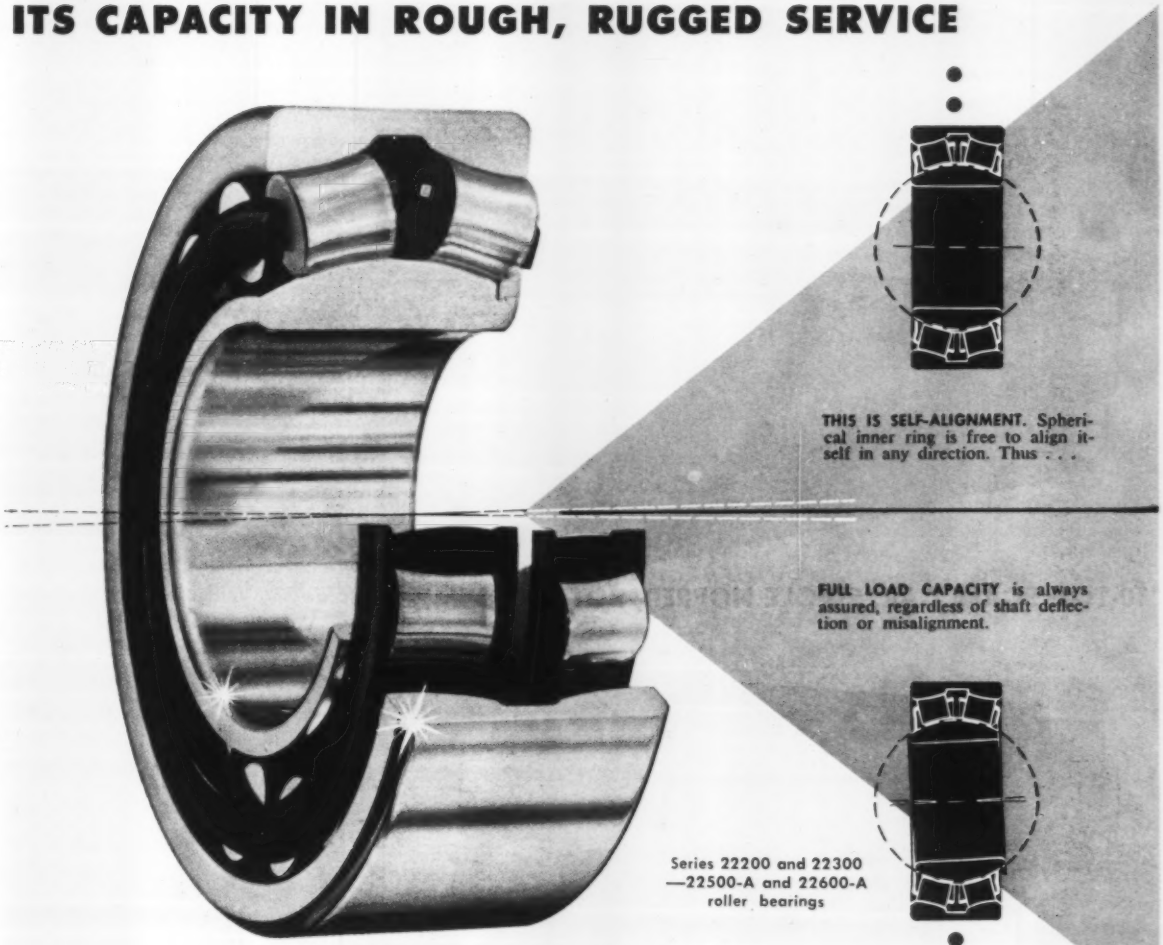
Not only did this method reduce threading time from 2 hours to 4 minutes, but it also produced a very economical 50 pieces between chaser grinds. This is particularly impressive when it is remembered that the thread was 29 inches long and the hardness of the material threaded was near the limits of machineability.

Many other LANDIS machines are every day making significant savings producing all types of threads. Perhaps we may help you make similar economies in your thread production.

LANDIS

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

Self-aligning TO KEEP ITS CAPACITY IN ROUGH, RUGGED SERVICE


THIS IS SELF-ALIGNMENT. Spherical inner ring is free to align itself in any direction. Thus . . .
FULL LOAD CAPACITY is always assured, regardless of shaft deflection or misalignment.
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Spherical LINK-BELT roller bearing compensates for shaft deflection, weaving of supports

MANY leading makers of tough duty equipment now design without bulky supports to prevent deflections. They're using this spherical Link-Belt roller bearing that *compensates for misalignment* . . . always keeps its full capacity for handling radial and thrust shock loads without "pinching."

In addition, it's factory-adjusted, easy to mount and available everywhere with internationally standardized boundary dimensions.

Link-Belt also makes industry's most complete line of ball and roller bearing blocks. They're all in Book 2550—yours for the asking at any of 40 Link-Belt offices or our Authorized Stock-Carrying Distributor.

14.443-A

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self-aligning ball and roller bearings

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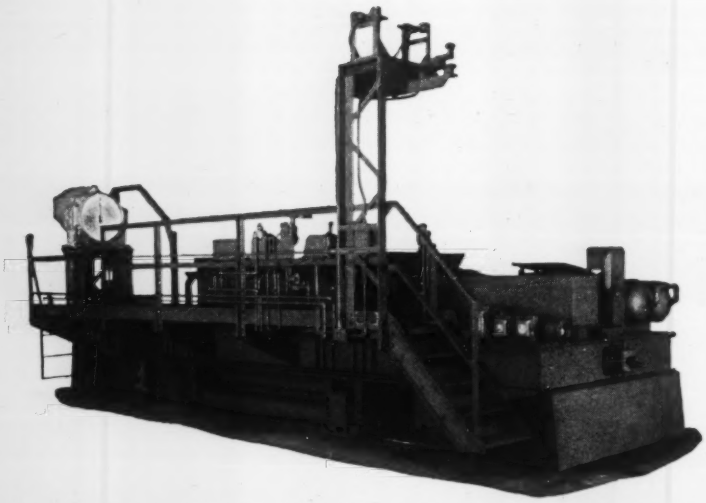
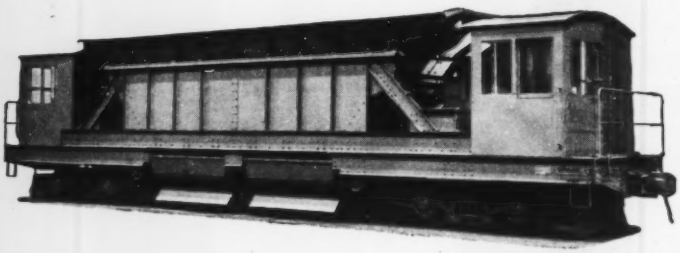
HERE'S *built-in* STAMINA *that spells* DEPENDABILITY

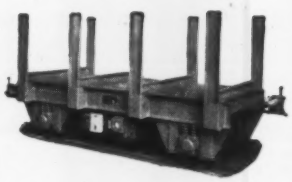


10-TON SCALE CAR, SINGLE HOPPER, BOTTOM DUMP



75-TON ORE TRANSFER, GABLE BOTTOM, SIDE DUMP

Atlas "single-lever" Safety-Type transfers give outstanding short-haul service . . . such as between buildings, for cross-bay crane service, and movement in production. Powered to meet your operating needs . . . storage battery, diesel or gas-electric, or cable reel.



Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

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LETTERS
TO THE EDITORS

STEEL: Preferred Magazine

Please send a copy of the article, "Quality Control for Automatics" (Feb. 18, page 178). Your publication is one of the most preferred magazines for my immediate reading. Please keep up the fine work you are doing for all metalworking plants.

Homer H. Cross
Supervisor
Bedford Gear & Machine Products Inc.
Bedford, O.

Compliments Reporting Style

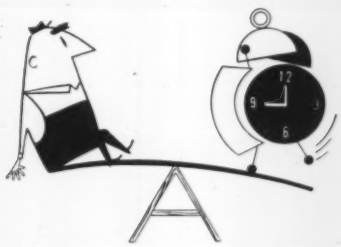
Please furnish me with eight copies of the article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93). Compliments on its boiled down, concise style of reporting.

Noel Runyan
Supervisor-Organization Planning
Great Lakes Steel Corp.
Division of National Steel Corp.
Detroit

I would appreciate two copies of this interesting and informative article for distribution among our key personnel.

W. E. Clark
Executive Vice President
Dravo Corp.
Pittsburgh

Balancing Output with Hours



I have just read your article, "Short Week: Fact Vs. Fancy" (Feb. 18, page 107), and found it interesting and informing. I would appreciate a copy. Since there has been much controversy on this subject, it appeared at an appropriate time.

P. H. Brotzman
Metallurgist
Firestone Tire & Rubber Co.
Akron

Writer Profits from STEEL

This is a long overdue word of thanks to the editors.

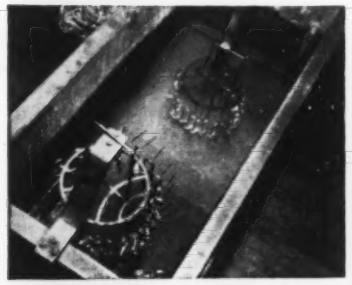
As you know, a writer tends to write on subjects about which he thinks he's well informed. My continued acquaintance with your publication (plus some prewar experience in the industry) gave birth to a series of booklets on the "Romance of Steel," which are widely syndicated to steel firms for employee reading racks and other informational uses.

Without the power of suggestion (and reliable information) supplied by STEEL, the chances are enormous that I would have concentrated on some other subject, not nearly so gratifying or so rewarding.

My sincere thanks for your excellent

(Please turn to page 12)

Vapor degreasers – manual or conveyor – show better production with TRICLENE® D



"Brighter cleaning... 50-75% longer between cleanouts"... *American Hardware*

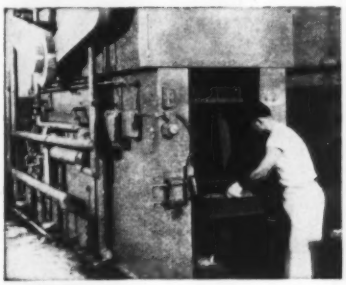
The P. & F. Corbin and Russell & Erwin Divisions of the American Hardware Corp., New Britain, Conn., are well-known for their complete line of builders' hardware which includes locks and door fittings with highly polished surfaces of brass, bronze, copper, steel and zinc.

Since these two divisions began using "Triclene" D trichlorethylene exclusively in six conveyorized and three manual degreasers, they report: "Brighter cleaning . . . no necessity to wipe parts before lacquering." They also noted a steadier pH and that operations went 50 to 75% longer between cleanouts and that the coils were easier to clean.

"Far fewer rejects from etching and staining on aluminum"... *Hecker Manufacturing Co.*

One of the big problems this San Francisco firm had to contend with was etching and staining on the highly polished surfaces of their aluminum shower and tub enclosures when the solvent formerly used developed a high acid content. This too frequent occurrence resulted in excessive loss of production from rejects and downtime.

"Since changing to 'Triclene' D," reports Mr. Cary, Plant Superintendent, "we've noticed a big reduction in the number of rejects, and solvent control is no problem at all. This adds up to real savings in maintenance and production costs."



"We have less downtime and consistently high production"... *Standard-Thomson Co.*

When you make accessories for the aircraft, automotive and window-hardware industries, as does Standard-Thomson in Dayton, Ohio, your production lines must match theirs in speed and efficiency. Substandard work and downtime can be very costly indeed. And every operation *eliminated* speeds up production.

Here's what they report: "We haven't any concern about solvent condition since we started using 'Triclene' D. We've noticed a big reduction in the number of rejects due to etching, too. Moreover, we've eliminated bright dipping of brass parts and the time between degreaser cleanouts has been increased from two to six weeks."

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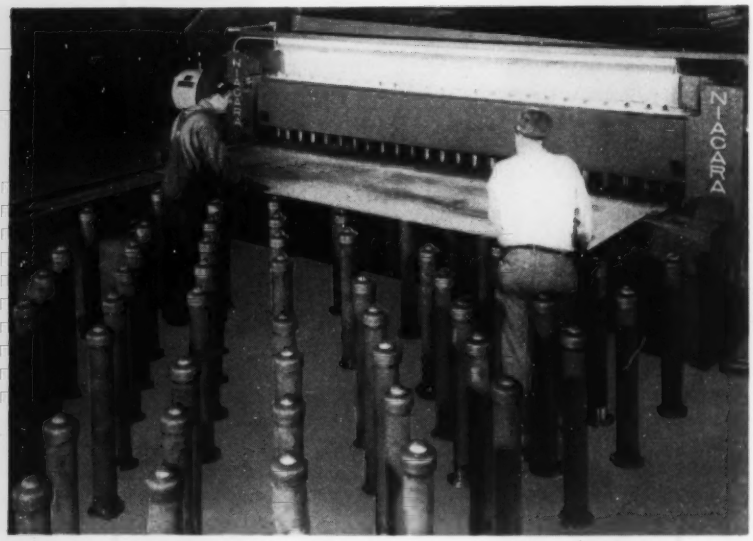

A typical installation of heavy duty ball transfers designed to handle plates at brakes and shears.

It was over 50 years ago that the first Mathews Conveyers were designed and built—and from that early equipment has come the development of the Mathews **continuous flow** conveying systems of today. In these 50 years Mathews engineers have developed a complete line of gravity and power conveyers and special conveying machinery to serve the metalworking industries in the United States and Canada. Whatever is required in the way of modern conveying machinery, you'll find that Mathews has it, and that Mathews Conveyers are your best buy.

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MATHEWS
Fifty Years of Leadership in Mechanized Handling

LETTERS

(Concluded from page 10)

magazine. Although many thousands of people must read it to their profit, I doubt that many readers can claim such tangible, personal benefits.

Vaughan Shelton
95 Longue Vue Drive
Pittsburgh

Useful to Organization

We have found your article, "Atomic Business . . . How You Can Get It" (Nov. 19, page 142), interesting and informative. We would like to obtain five copies.

Sid L. Mickle
Acting Manager-Sales Engineering
Continental Can Co. Inc.
Coffeyville, Kans.

Optimistic About Economy

If you will send me a dozen copies of the editorial, "Don't Cry Wolf" (Feb. 4, page 57), I will be glad to pass them along to our coal traffic field offices.

I am optimistic, too, and thank God for it. Congratulations, and let me say, after spending 14 pleasant years in progressive Cleveland, I can well understand your attitude.

George C. Bauer
Coal Traffic Manager
Traffic Department
Baltimore & Ohio Railroad Co.
Baltimore, Md.

We shall appreciate 100 copies to distribute to our field men.

R. M. Hammes
General Sales Manager
Niagara Filters Division
American Machine & Metals Inc.
East Moline, Ill.

Production Idea Appreciated

Your article, "Pieces by the Slice" (Feb. 4, page 101), has been read with considerable interest. I would appreciate receiving three copies.

H. R. Wimmersberger
Vice President
Pittsburgh Tool Steel Wire Co.
Monaca, Pa.

STEEL Eagerly Sought After

. . . I would like to say that STEEL is eagerly sought after because of the complete information it gives. Your excellent coverage is greatly appreciated.

Robert C. English
4430 Red Arrow Rd.
Flint, Mich.

Telegram on German Study

WOULD APPRECIATE REFERENCES AND ANY ADDITIONAL INFORMATION ON THE USE OF PLASTICS IN ROLLER BEARINGS IN GERMANY, AS REFERRED TO IN YOUR TECHNICAL OUTLOOK OF FEB. 11, PAGE 103.

W. Blinder
New Departure Division
General Motors Corp.
Bristol, Conn.

• *This information same from a June, 1955, paper, "Plastic Roller Bearing Race Separators — Critical Operating Properties of Plastics," by Dr. A. Gremer, Schweinfurt, Germany. A U.S. Navy Bureau of Ships translation of 25 pages, PB 121363, is available for 75 cents from the Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C.*

Helpful Data from
DE LAVAL

How to calculate the efficiency of worm gearing

The efficiency of worm gearing is determined by frictional losses at the tooth contact, bearings and oil seals plus losses from oil churning and windage. A formula for efficiency at the tooth contact may be developed from a consideration of the forces at the contact. Figure 1 shows these forces acting on a developed section of the worm thread. For simplicity the pressure angle has been assumed to be zero.

The coefficient of friction of the worm and gear is a function of the materials, finish, lubrication and rubbing speed. The latter is the relative speed between a point on the pitch surface of the gear and one on the pitch surface of the worm. The coefficient of friction varies very little at high rubbing speeds but rises with increasing rapidity as the speed drops below 500 fpm.

The efficiency formula developed in Figure 1 involves worm lead angle and the friction angle. Figure 2 provides a relationship between friction angle and rubbing speed based on tests made on accurately manufactured gearing consisting of hardened and ground worm and bronze gear operating in oil.

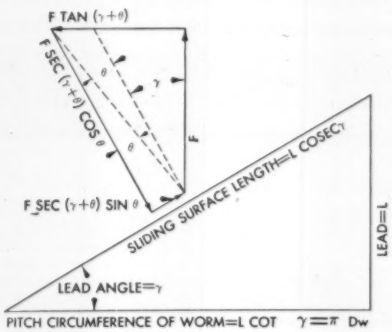
The formula for rubbing speed is:

$$V = \frac{.262\ Dw \times \eta}{\cos \gamma}$$

where

$V =$ Rubbing speed – feet per minute
$Dw =$ Worm pitch diameter – inches
$\eta =$ Worm speed – rpm
$\gamma =$ Worm lead angle

FIGURE 1.
Development of equation for efficiency at contact between worm and gear



F=TANGENTIAL FORCE ACTING ON GEAR

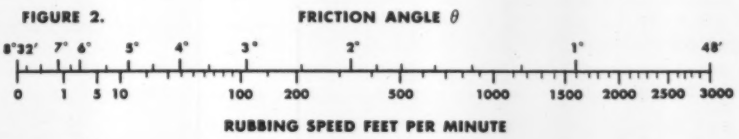
F TAN ($\gamma + \theta$) = TANGENTIAL FORCE APPLIED TO WORM

F SEC ($\gamma + \theta$) COS θ = FORCE NORMAL TO CONTACT SURFACE

F SEC ($\gamma + \theta$) SIN θ = FRICTIONAL FORCE

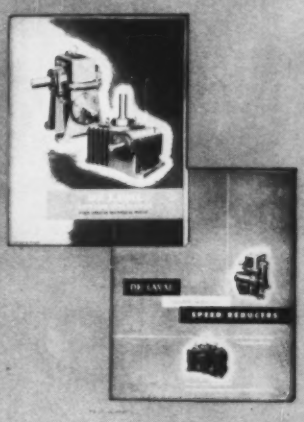
$$\text{EFFICIENCY} = \frac{\text{WORK REALIZED}}{\text{WORK APPLIED}} = \frac{L \times F}{L \cot \gamma \times F \tan (\gamma+\theta)} = \frac{\tan \gamma}{\tan (\gamma+\theta)}$$

FIGURE 2.



DE LAVAL Worm Gear Speed Reducers Offer Efficiencies to 96%

Ruggedly built for long efficient service De Laval speed reducers are made in horizontal and vertical single reduction units in ratios of 3:1 to 100:1. They are also available in double horizontal and vertical double reduction units as well as in helical-worm and double-worm design. Ratios from 37.8:1 up to 6400:1.



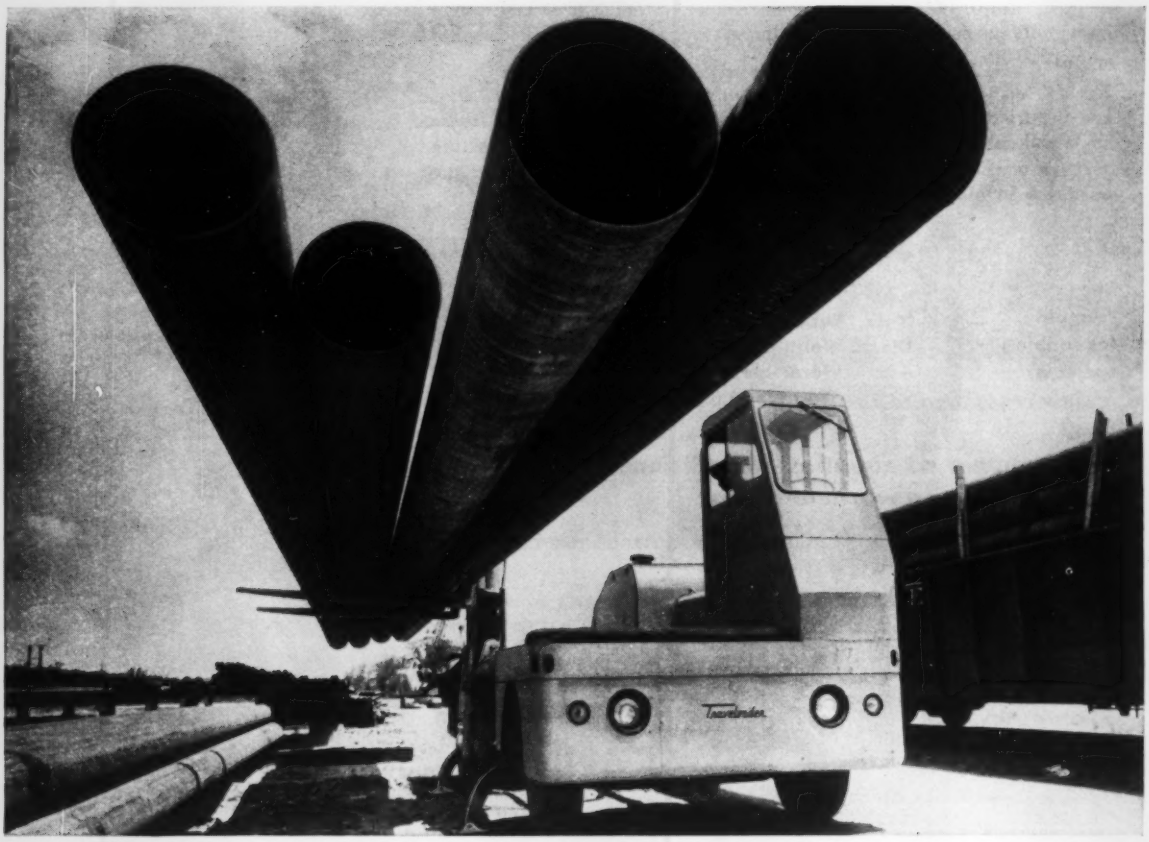
Write for your copies of Catalogs G-WBV and G-WWH to De Laval Steam Turbine Company, Trenton 2, New Jersey.

DL-373

WORLD'S WORD FOR ELEVATOR QUALITY

OTIS ELEVATOR COMPANY, ALWAYS THE LEADER IN VERTICAL MATERIALS HANDLING, HAS TAKEN ITS FIRST STEP TOWARDS LEADERSHIP IN HORIZONTAL MATERIALS HANDLING.

THE BAKER-RAULANG COMPANY . . .



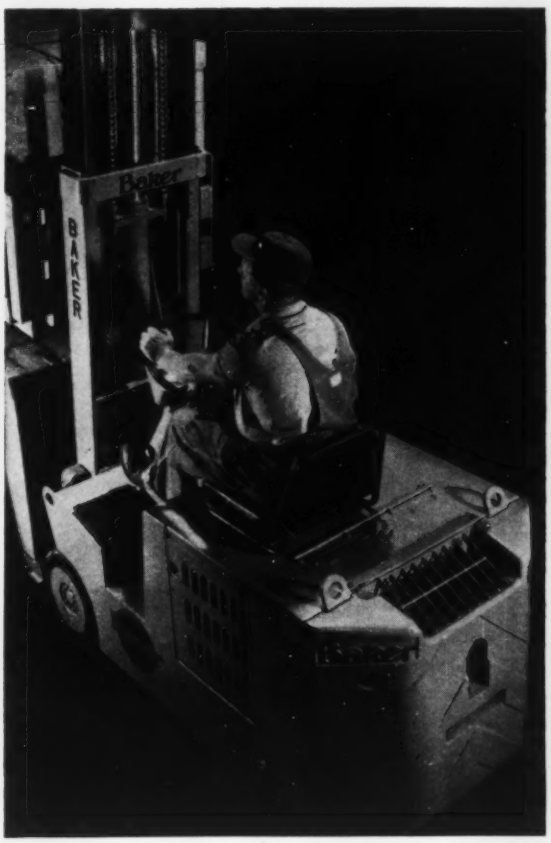
Among the products of The Baker-Raulang Company is the Traveloader, an entirely new concept in the field of mechanized handling of long, bulky loads. The Traveloader performs three distinct operations. It stacks like a fork truck, carries like a straddle truck, and delivers like a road truck. Gas or Diesel-powered Traveloaders are available in 6,000 to 30,000 pound capacities. A 4,000 pound capacity Electric-powered Traveloader with solid tires is available for indoor handling in narrow aisles.

OTIS has greatly expanded the engineering and research facilities of its recently acquired subsidiary, the BAKER-RAULANG COMPANY, Cleveland, Ohio. The product line has been broadened. It now includes a complete range of GAS and ELECTRIC Fork Trucks and an exclusive line of GAS and ELECTRIC side-loading Traveloader® Trucks, also Crane and Platform Trucks. You can now look to OTIS and BAKER for progress in horizontal materials handling.

.... AN OTIS SUBSIDIARY, IS THE MAKER OF

Baker®

GAS AND ELECTRIC
industrial trucks

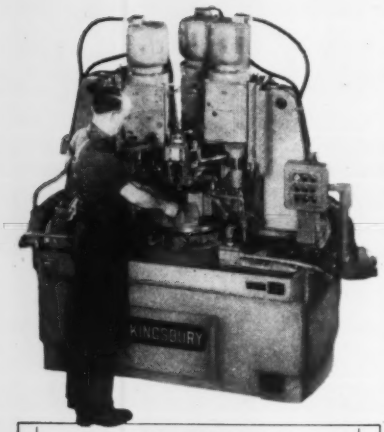


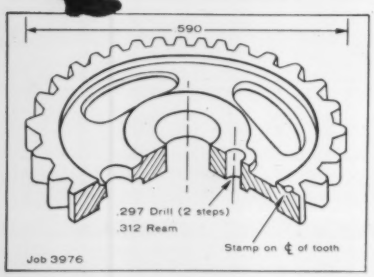
Baker's newest gasoline powered fork truck is available in many models, with capacities to 6,000 pounds. It features low initial cost, high lift, plus speed and economies of operation.

The battery-powered fork trucks in the Baker line range in capacity from 1,000 to 15,000 pounds. Baker was a pioneer in materials handling and has been producing electric industrial trucks for more than 35 years.

450 PER HOUR GROSS

- drilled
- reamed
- stamped





The operator merely loads and unloads this Kingsbury. The stamping device operates at his station. Two automatic units drill and one unit automatically reams. Drilling in two steps shortens the time cycle and increases production.

Kingsbury indexing automatics save money on simple jobs like this and on large complex jobs, too. Machines are all tooled, ready to produce. We invite your inquiry. Kingsbury Machine Tool Corporation, Keene, N. H.

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INDEXING AUTOMATICS for high production drilling and tapping

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...vary from 3/8" to 5/8"
...s to be cut.

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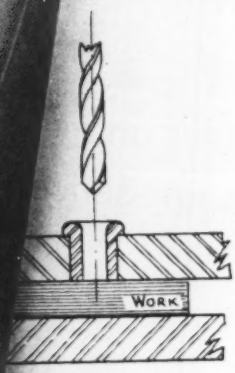

Fig. 2

...e accurately located under drill to pre-
...g bushing and becoming dull.

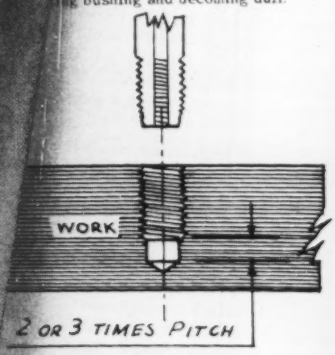

Fig. 3

...rilling glass-base material use Morse quick-twist
...olized drill. For tapping procedure has been
...ardized for all types of materials. A ground high-
...d steel Morse electrolized tap is recommended.

Why FORMICA says:

Reg. U. S. Pat. Off.

"Use MORSE Electrolized Tools!"

Top performance on the job, hole after hole after hole . . . that's why the instruction manual of the Formica Corporation specifies:

"For Drilling Glass-Base Material:
MORSE Quick-Twist *Electrolized* Drill . . .

"For Drilling Paper and Fabric-Base Materials:
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"For Tapping:
Procedure has been standardized for all types of materials. A ground High-Speed Steel MORSE *Electrolized* Tap is recommended."

Formica, like every other concern that has tested it, finds that the exclusive MORSE process of *Electrolizing* gives up to 30% longer tool life on the toughest jobs. And the only source for *Electrolized* cutting tools is the Morse-Franchised Distributor.

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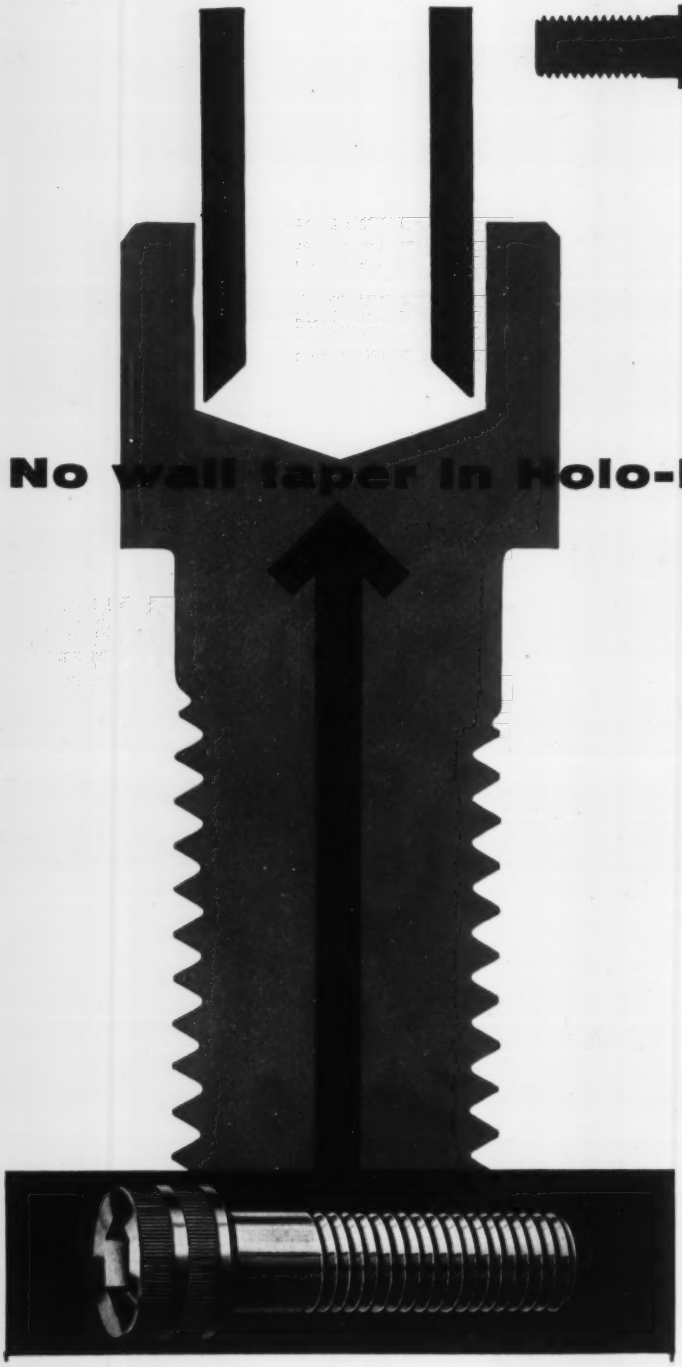
means "THE MOST" in Cutting Tools



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No wall taper in Holo-Krome sockets!

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For the finest in Socket Screw products . . . for revolutionary SAME-DAY SERVICE, the name to remember is Holo-Krome!

LOOK INSIDE A HOLO-KROME SOCKET!

Send in the coupon below and we'll send you FREE an H-K Socket Cap Screw (we've omitted heat treating to let you get a better look at the mirror finish and sharp hex corners under the usual black finish). Look it over carefully, and see for yourself what a real difference H-K quality and skill can make!

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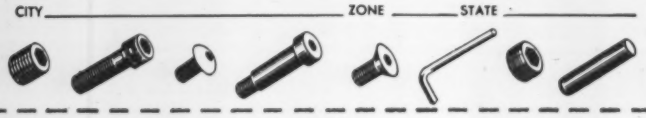

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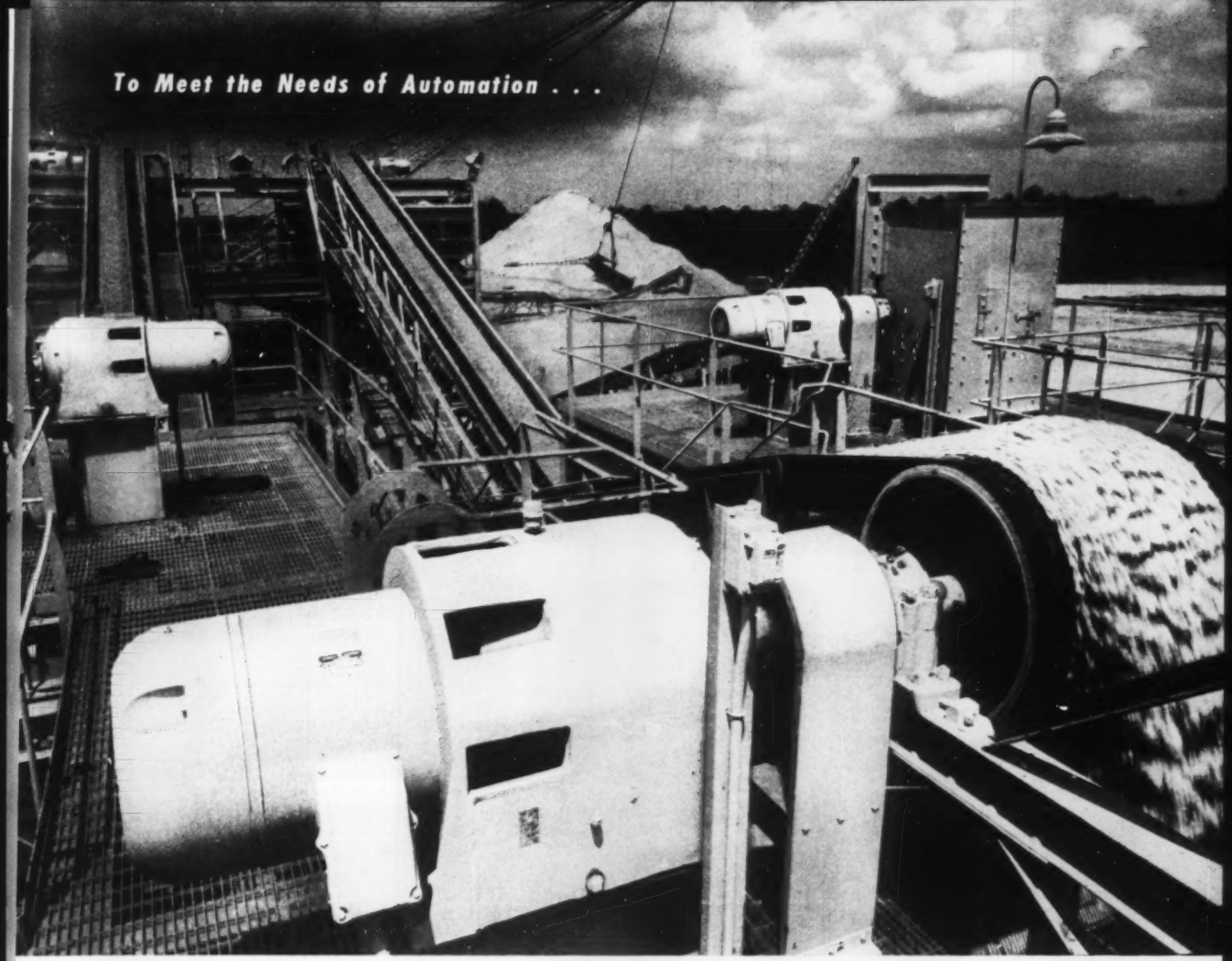

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For increased productivity, reliable drives are important in maintaining a constant flow of materials through your plant. With General Electric gear-motors you can expect the same dependable service experienced by a large southeastern cement plant. There, G-E gear-motors driving the conveyor system, operate continuously. In five years these motors have required no maintenance other than infrequent oil changes.

In addition, General Electric gear-motors give you several other bonus features:

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MORE COMPACT—Packaged gear-motor design accomplishes speed reduction in a minimum of cubic feet, saves valuable space.

General Electric's new decentralized Gear Motor and Transmission Components Department is devoted solely to the design and manufacture of all types and sizes of gear-motors. For more information write for bulletin GEA-6027, Section 851-3, Schenectady, N. Y., or contact your G-E Apparatus Sales Office or nearest gear-motor supplier. *Gear Motor and Transmission Components Department, General Electric Co., Paterson N. J.*

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**A partial list of many possible applications.*

CONVEYORS—belt, assembly, bucket, chain or screw.

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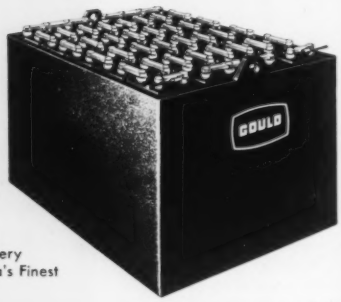

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CALENDAR
OF MEETINGS

Mar. 11-15, National Association of Manufacturers: Institute on industrial relations. Hollywood Beach hotel, Hollywood, Fla. Association's address: 2 E. 49th St., New York 17, N. Y. Information: Sybl S. Patterson, associate director, Industrial Relations Division, National Association of Manufacturers.

Mar. 11-15, 1957 Nuclear Congress: Convention Hall, Philadelphia. Co-ordinator: Engineers Joint Council, 29 W. 39th St., New York 18, N. Y.

Mar. 13-15, National Fluid Power Association: Annual meeting, Hollywood Beach hotel, Hollywood, Fla. Association's address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

Mar. 13-15, Radio-Electronics-Television Manufacturers Association: Spring meeting, Sheraton Park hotel, Washington. Association's address: 777 14th St. N.W., Washington 5, D. C. Secretary: James D. Secrest.

Mar. 14-15, National Industrial Conference Board: Atomic energy conference, Benjamin Franklin hotel, Philadelphia. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Mar. 17-19, Steel Founders' Society of America: Annual meeting, Drake hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George K. Dreher.

Mar. 18-21, Society of the Plastics Industry Inc.: Annual national conference and plastics exposition, Biltmore hotel and Shrine Hall, Los Angeles. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Mar. 18-21, American Society of Mechanical Engineers: Gas turbine power conference, Sheraton-Cadillac hotel, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Mar. 20-22, Society of Automotive Engineers Inc.: National production meeting and forum, Hotel Statler, Buffalo. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 25-27, American Society of Tool Engineers: Annual meeting, Shamrock hotel, Houston. Society's address: 10700 Puritan Ave., Detroit 21, Mich. Executive secretary: Harry E. Conrad.

Mar. 25-29, Western Metal Congress & Exposition: Biennial exposition, Pan-Pacific Auditorium, Los Angeles. Information: American Society for Metals, 7301 Euclid Ave., Cleveland 3, O. Managing director: William H. Eisenman.

Mar. 25-29, American Society for Metals: Biennial technical meeting, Ambassador hotel, Los Angeles. Society's address: 7301 Euclid Ave., Cleveland 3, O. Managing director: William H. Eisenman.

Mar. 25-29, Society for Nondestructive Testing: Biennial technical meeting, Ambassador hotel, Los Angeles. Society's address: 1109 Hinman Ave., Evanston, Ill. Secretary: Philip D. Johnson.

Mar. 26-27, Instrument Society of America, Pittsburgh Section: Annual conference on instrumentation for the iron and steel industry, Hotel Roosevelt, Pittsburgh. Information: Fred D. Marton, 845 Ridge Ave., Pittsburgh 12, Pa.

Mar. 27-29, American Power Conference: Hotel Sherman, Chicago. Information: Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

Apr. 1-3, International Acetylene Association: Annual meeting, Nicollet hotel, Minneapolis. Association's address: 205 E. 42nd St., New York 17, N. Y. Secretary: H. F. Reinhard.

HOW *Cambridge* Woven Wire Belts help Heat Treaters

increase uniformity, speed production

By providing continuous movement through heat treating cycles, woven wire conveyor belts eliminate batch handling, increase product uniformity and production capacity in annealing, brazing, quenching, tempering, sintering, etc. EXAMPLE:

Continuous Annealing

MOVING BELT carries a stream of brass light bulb ferrules through furnace for continuous uniform annealing at 1400° F.

OPEN MESH of Cambridge belt allows free circulation of heat around load so that hot spots are eliminated. Open mesh construction also permits rapid drainage in wet processes such as quenching and washing.

ALL-METAL BELT withstands heat up to 2100°F. (as in copper brazing) without damage, provides lasting strength because there are no seams, lacers or fasteners to break or wear.

SPECIAL RAISED EDGES hold parts on belt, are typical of a variety of side and surface attachments available to hold the product during flat or inclined movement.

Cambridge Woven Wire Conveyor Belts are made in any size, mesh or weave, from any metal or alloy, and can be used under a wide range of conditions . . . hot or cold, wet or dry. Call your Cambridge Field Engineer to discuss how you can cut costs with continuous processing on woven wire conveyor belts. Look for his phone number under "Belting, Mechanical" in the Yellow Pages or write for FREE 130-PAGE REFERENCE MANUAL.

The Cambridge Wire Cloth Co.

Department J, Cambridge 3, Maryland

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OFFICES IN PRINCIPAL INDUSTRIAL CITIES

. . . how else could this job be handled so well?

Through exclusive features like these a Gerlinger fork lift truck enables each operator to multiply "manpower" and give you a new concept of profitable mass-handling:

- Exclusive Floating-Type Boom Action—faster, friction-free lift
- Counter-active Weight Distribution—better traction and maneuverability
- Pivotal Mounted Steering Assembly—stabilized load on any road
- Heavy-Duty Steel Channel Frame—bonus years of reliable service
- Maximum-Power Torque Converter Drive—smoother operation, less wear

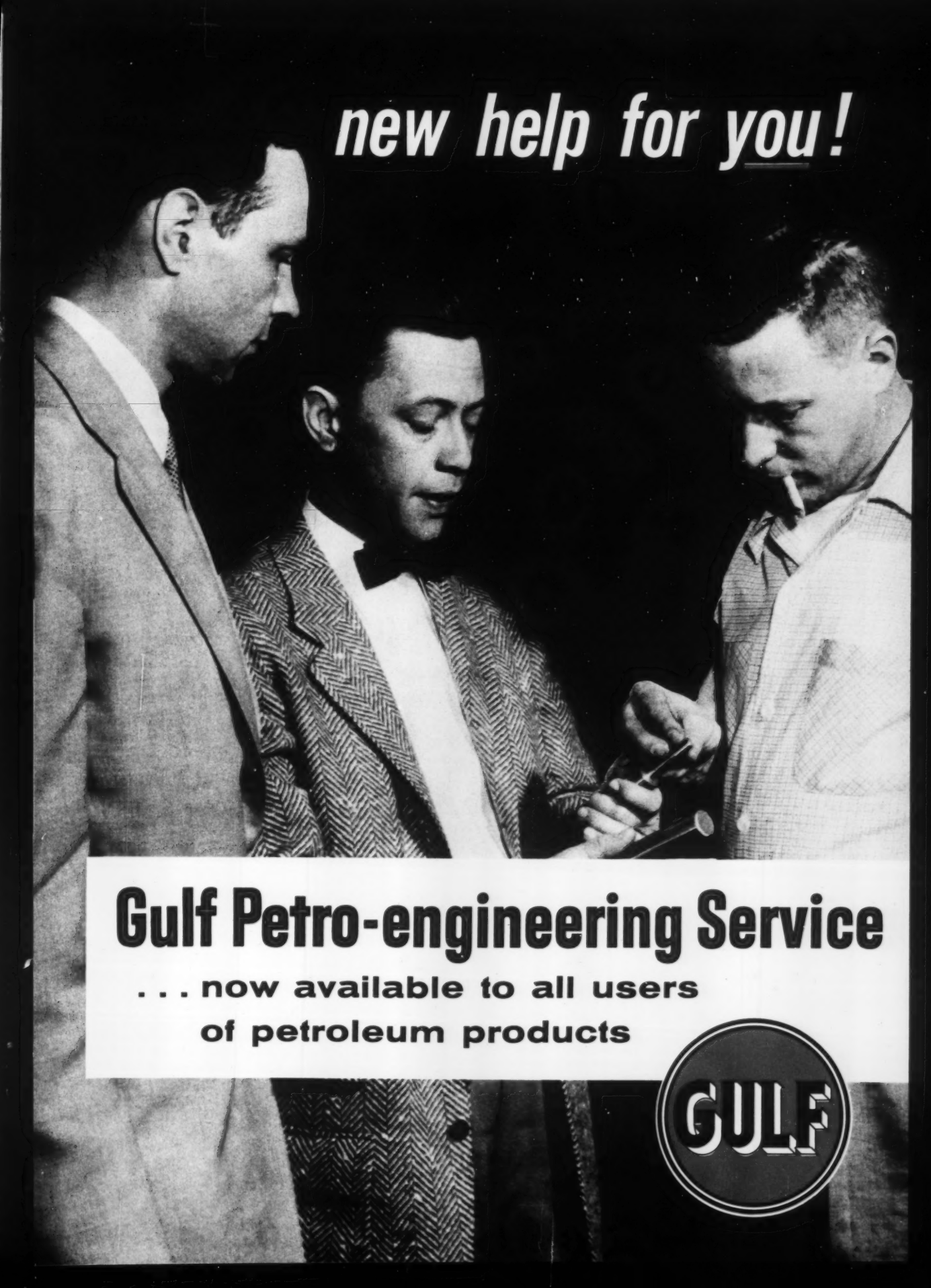
If you move and stack loads between a few hundred pounds and twenty tons, look to the combined Towmotor-Gerlinger line to meet the most diversified specifications. This great new combination brings you the most complete range of fork lift truck capacities available from one source. More extensive service to match it, too.

Get catalog describing the lift trucks that will do the best job for you. Address: Gerlinger Carrier Co., Dallas, Oregon.

Leaders for 38 years in building Fork Lift Trucks and Carriers

TOWMOTOR ®
THE ONE-MAN-GANG
-GERLINGER

Gerlinger Carrier Company, Dallas, Oregon is a subsidiary of Towmotor Corporation, Cleveland, Ohio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Gulf Petro-engineering Service
. . . now available to all users
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Proper engine tune-up procedures mean maximum fuel economy in fleet operations. Gulf Sales Engineers work closely with fleet maintenance superintendents to help save fuel, lengthen periods between overhauls, and increase availability of equipment.

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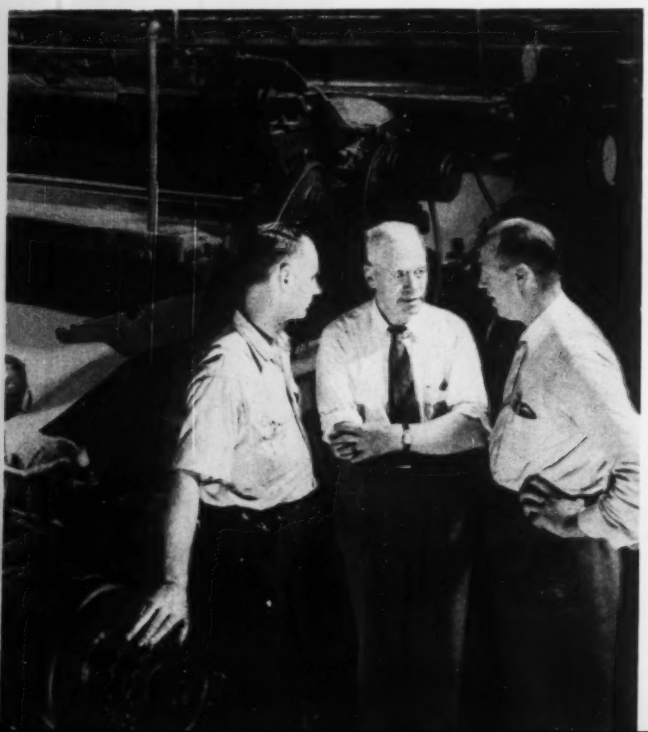
brings you practical involving the use of

Gulf Sales Engineers can provide practical assistance to paper mill operators on any process or problem that involves petroleum products.



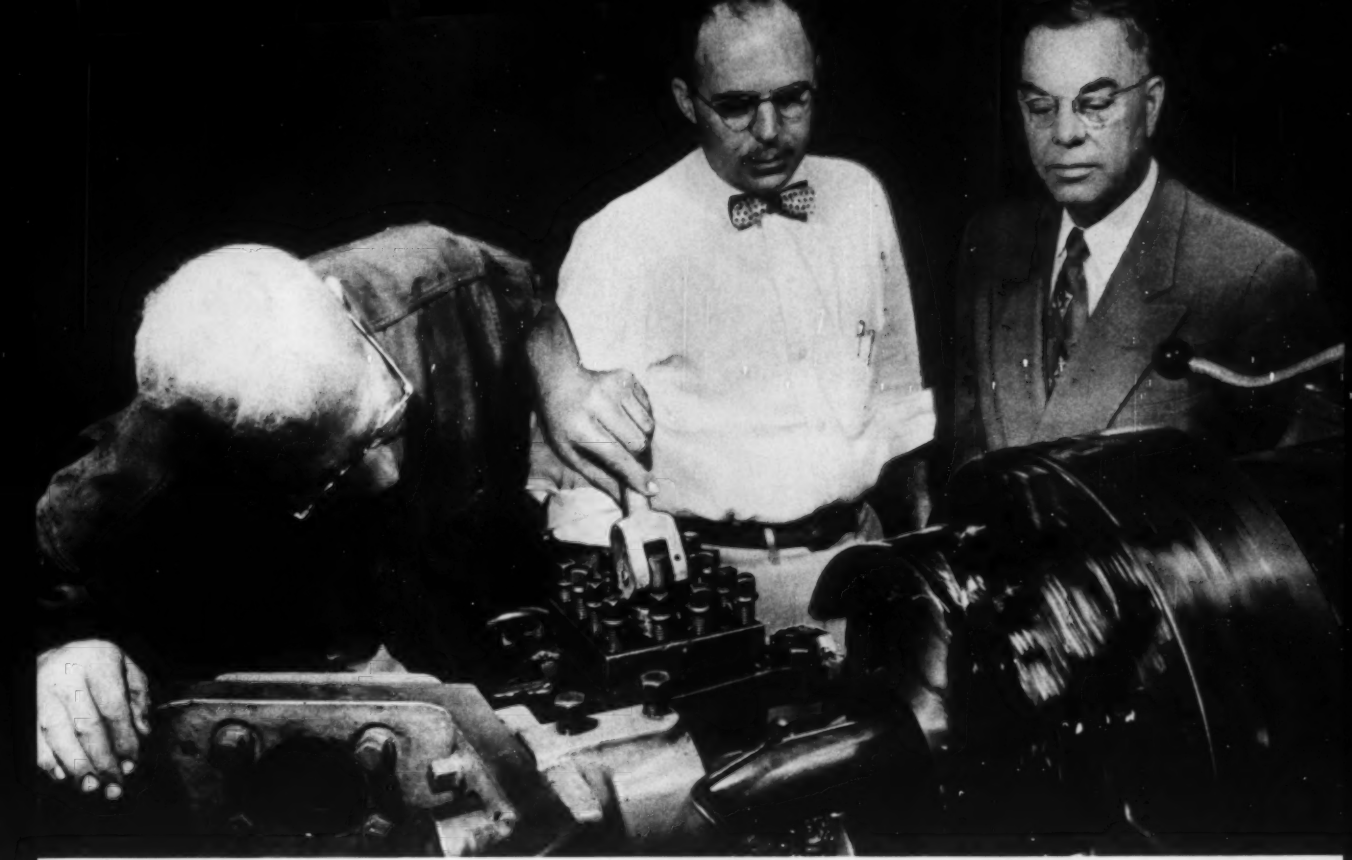
If you are engaged in manufacturing, mining or quarrying . . . construction or transportation . . . communication or public utility service—you can profit from Gulf Petro-engineering Service.

All of these fields use petroleum products. Many problems arise in connection with their use—problems of proper selection, of storage, of dispensing, of application schedules. And, most important of all, problems of equipment performance!

Very few companies, however, find it practical to hire or train qualified people to perform this specialized engineering job. Gulf offers you its own trained staff to assist you with these problems.

Gulf Petro-engineering Service puts a petroleum specialist in your plant or other base of operations to give you impartial, expert advice on any problem in any way related to the uses of petroleum products.

You can get Gulf Petro-engineering Service if you are



A Gulf Petro-engineering Service specialist can help you select the most suitable cutting fluid for each machining operation. Chances are he will find practical ways to improve production, increase tool life and lower costs.

-engineering Service

help on every problem and process petroleum products

a user of petroleum products—whether or not you have been buying those products from Gulf.

There is no charge for this service.

In essence, here's what Gulf Petro-engineering Service offers you . . .

1. Expert help with any immediate problem involving use of *any* petroleum product.
2. Practical help on any long-range problem, including those which may involve new uses or new types of petroleum products.
3. A survey of your entire operation. Aim: to help you achieve greater efficiency and economy in the use of fuels, lubricants, cutting oils, rust preventives and process oils.

Gulf has a large group of trained and experienced sales engineers ready to serve you. The typical Gulf Sales Engineer who contacts you is a graduate engineer. He has been well-schooled in the formulation and uses of petroleum products. He has the versatility and invaluable knowledge that comes through many years of practical field experience.

If yours is a highly involved or difficult problem, he can enlist the help of another specialist—a Gulf Product Application Engineer.

Behind Gulf field representatives are more than 1,300 scientists, engineers, metallurgists and chemists at Gulf laboratories specializing in the manufacture and application of petroleum products. Their knowledge, coupled with the experience of field engineers, adds up to a broader, better service than has ever been offered before to industrial and commercial users of petroleum products.

Take advantage of Gulf's Petro-engineering Service now. Use the coupon on the next page to send for booklet describing the complete service—or write or call your nearest Gulf office.

Gulf Petro-engineering Service

can be put to work for you immediately on any or all of these problems. It can help you . . .

- Plan the installation of more efficient fuel and lubricant storage and dispensing facilities.
- Get maximum fuel economy through proper engine tune-up procedures.
- Obtain maximum heat or power from each gallon of fuel oil through more efficient combustion.
- Establish proper oil change periods.
- Cut maintenance costs through improved application of lubricants.
- Select rust preventives according to the exact kinds of protection you need.
- Eliminate or reduce oil vapors, sludge deposits and corrosion of fuel oil storage tanks.
- Reduce the number and variety of lubricants used.
- Establish proper flushing procedures for both old and new equipment.
- Control dust on plant grounds and parking lots.

If you are faced with any of these common problems—or with any problems involving petroleum products in use—simply call your nearest Gulf District Office.

GULF OIL CORPORATION
Gulf Building, Pittsburgh 30, Pa.

☐ Send free Gulf Petro-engineering Service booklet.
☐ Have a Gulf Sales Engineer call.

Name_____ Title_____

Company_____

Street_____

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GULF

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Pittsburgh 30, Pa.

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*Oxygen-cutting is speeding metal-working throughout industry. Here a new manual LINDE blowpipe removes a giant riser fast and clean.

turn Problems into profits*

Oxygen-cutting blowpipes are cutting metals of all thicknesses, faster, and more economically than ever before. From one-of-a-kind jobs in small shops, to production line and foundry operations, new high production speeds and gas efficiency have made oxygen-cutting an almost indispensable tool to modern industry.

The new OXWELD C-63 blowpipe shown above is an example of the improved products which result from LINDE'S constant research and development in oxygen-cutting. This manual heavy-duty blowpipe will remove even the heaviest risers quickly and smoothly.

For the answer to all your cutting needs—whatever they may be—see LINDE'S complete line of oxygen cutting apparatus. Start saving now, contact your local representative today.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

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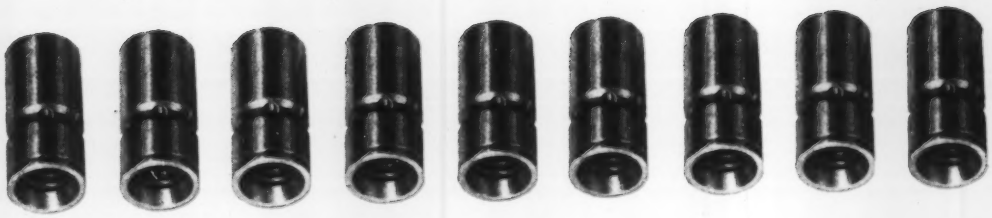
Linde

Trade-Mark

Mr. Smith goes to Florida!



Mr. Smith's books showed an excellent current ratio. His cash position was good; his surplus was substantial. Shortly thereafter, however, he entered a premature retirement.

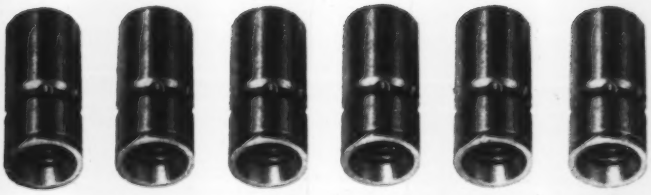
He had overlooked the fact that a large part of his company's fixed assets were machine tools, and their values shown on his balance sheet were simply bookkeeping entries. Those values didn't reflect obsolescence, nor show how expensive indirect labor, nonproductive floor space and downtime can be.

A closer look at your balance sheet may reveal the wisdom of investing in new production equipment. Its high rate of return makes good balance sheets better.

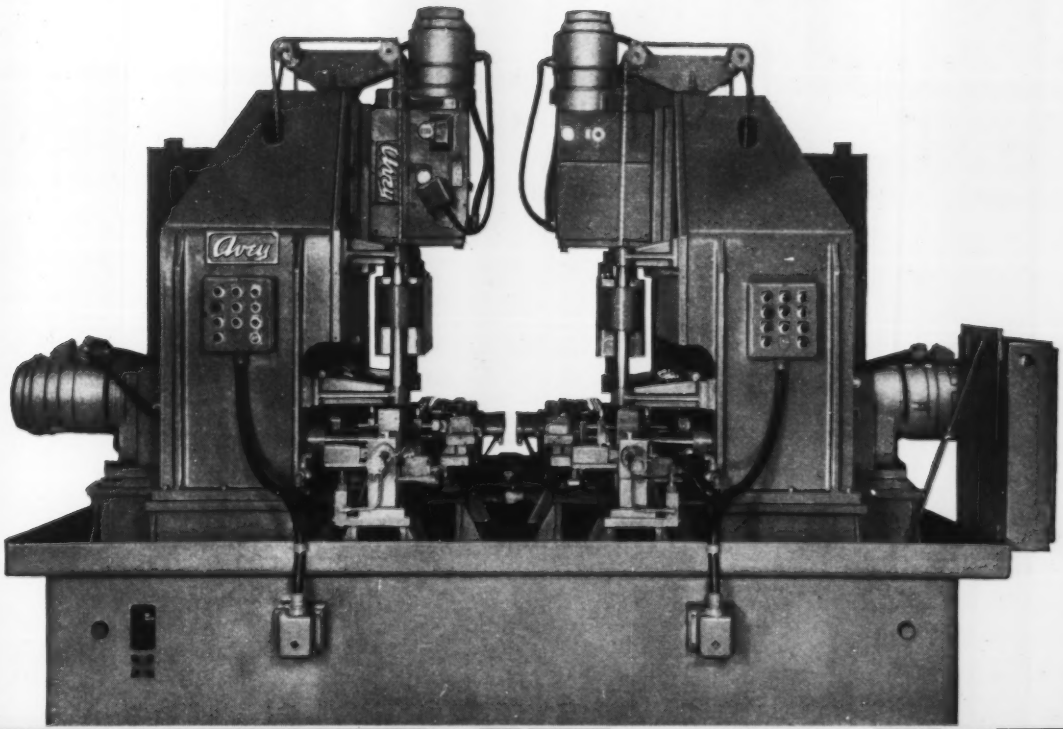
▸ **production data:** —This Avey Line-O-Dex drills and deburrs 3100 body sleeves per hour. On each half of machine, 3 parts at a time are indexed automatically; hydraulically clamped; drilled and deburred. Built to JIC specs except for 2-speed motors, which increase production.

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

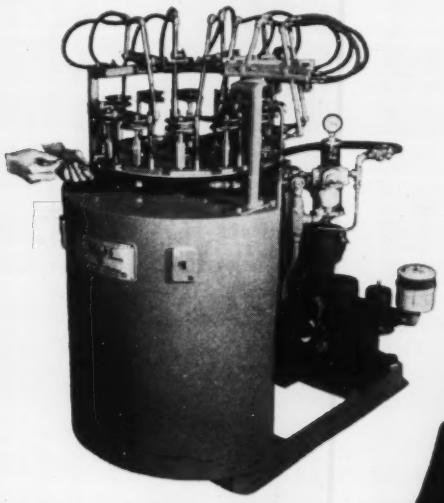


Avey



400 CRAFTSMAN SOCKET WRENCHES
Selas-brazed and hardened per hour

Fast, sure, low cost Selas brazing permits joining simplified *socket forging and turned shank* in lieu of a more complex *one-piece forging*. Preplaced, preformed filler ring produces optimum fillet, full strength in every joint.



Space-saving automatic Selas machine does the brazing; simplicity of operation permits use of unskilled labor. Additional savings result from use of accurately patterned brazing heat to harden the AISI 4041 steel wrench socket. Fuel cost only 2½c per hr.

This high quality CRAFTSMAN nut driver is sold by Sears for approximately 79c (set of 7 is about $4.98, varying by region). Selas automatic brazing maintains quality while achieving the required production economy.

High brazing skills are built into this automatic Selas machine through controlled combustion and accurate flame geometry. Specially-designed fixtures adapt to three shank diameters and nine socket sizes. The result is high volume, dependable brazing at lowest cost.

In addition to LOW UNIT COST you can expect these other advantages with Selas automatic brazing: √ Simple labor skills √ Speed √ Reproducible uniformity √ Wide variety of base and filler metals readily handled √ Single responsibility with Selas designing, building and servicing your machine.

Send for Bulletin No. 23 "Production Brazing and Soldering" and reprint "Mechanized Heating Puts Brazing on the Production Line."

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

Precision high-carbon strip steel with
uniform thickness, finish, and grain structure
to meet today's exacting design
and fabrication requirements.

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World's Largest Manufacturers of Precision Mechanical Springs

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Let's toss a bouquet to the modern super-market — one of the greatest time and trouble savers in present-day living.

But, have you ever stopped to think that, in the abrasives field, Norton brings you real super-market convenience? Here, in the world's largest line of abrasive products, is everything you need for every grinding job.

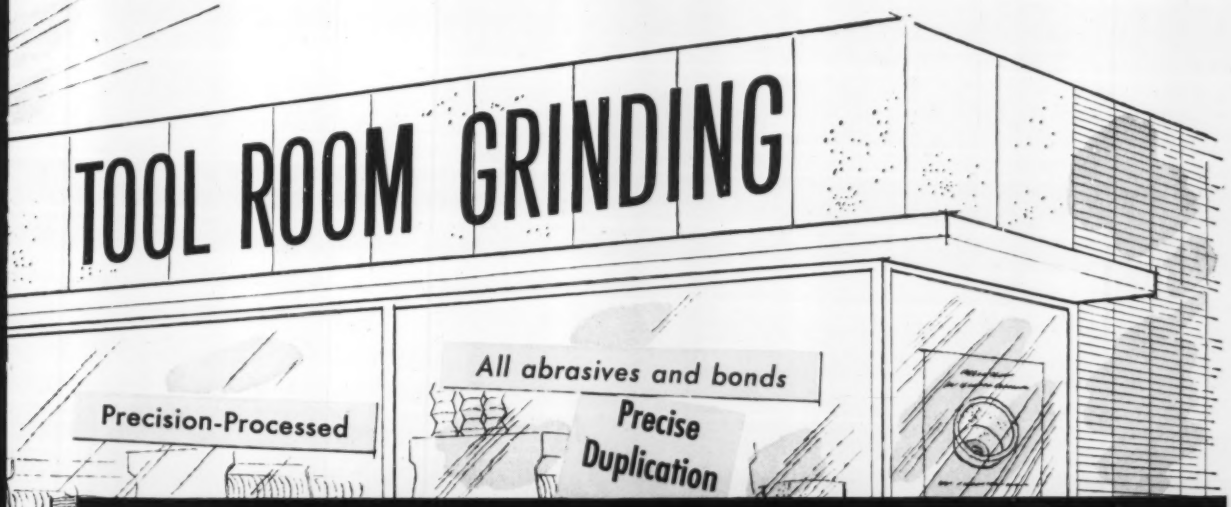
Take tool room grinding wheels. In these, as in all other categories, the Norton line is 100% complete. You don't have to shop around — going to one source for wheels that will sharpen steel tools, to another for diamond wheels, to another for mounted wheels.

You can get them all at Norton. And they're all the best wheels that can possibly be made. The advanced equipment and broad experience you find at Norton you'll find nowhere else in abrasives manufacture.

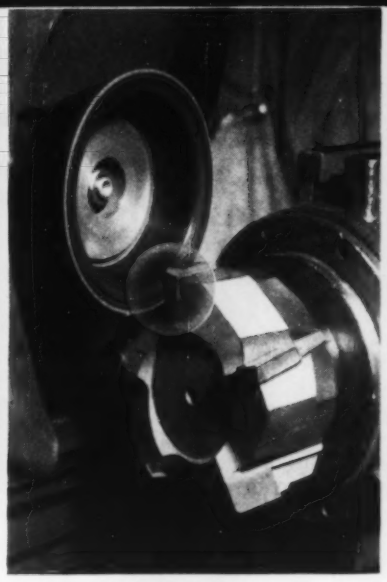
Advantages like these mean leadership. And they result in precision-processed, precision-performing wheels that grind exactly alike — from wheel to wheel and lot to lot.

See Your Norton Distributor for wheels that will bring the value-adding, profit-boosting "Touch of Gold" to all your tool room grinding operations. Ask him for the two helpful booklets — *A Handbook on Tool Room Grinding* and a booklet on *How To Select Wheels For Precision Grinding Tool And Constructional Steels.* Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. Behr-Manning Company, Troy, N. Y., a division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated. **For the booklets or other information write to Norton Company, Worcester 6, Mass.**

TOOL ROOM GRINDING



FOR SHARPENING STEEL TOOLS, as well as for surface, cylindrical and internal grinding on all steels, Norton G Bond and BE Bond Wheels — in 32 ALUNDUM*, 38 ALUNDUM, 19 ALUNDUM or the new non-premium priced 44 ALUNDUM abrasive — add the money-saving, cost-cutting "Touch of Gold." These vitrified bonds are the most efficient ever developed for precision and semi-precision grinding.



FOR CARBIDE GRINDING, Norton diamond wheels are the recognized "Crown Jewels." Made in the regular B resinoid bond for wet grinding and the B6 resinoid bond for dry grinding. For many carbide grinding jobs Norton K Bond CRYSTOLON* wheels are often the best investment.

FOR DIE AND MOLD FINISHING Norton mounted wheels bring you big savings on the widest range of tool room jobs. They're a 100% complete line, for all requirements.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

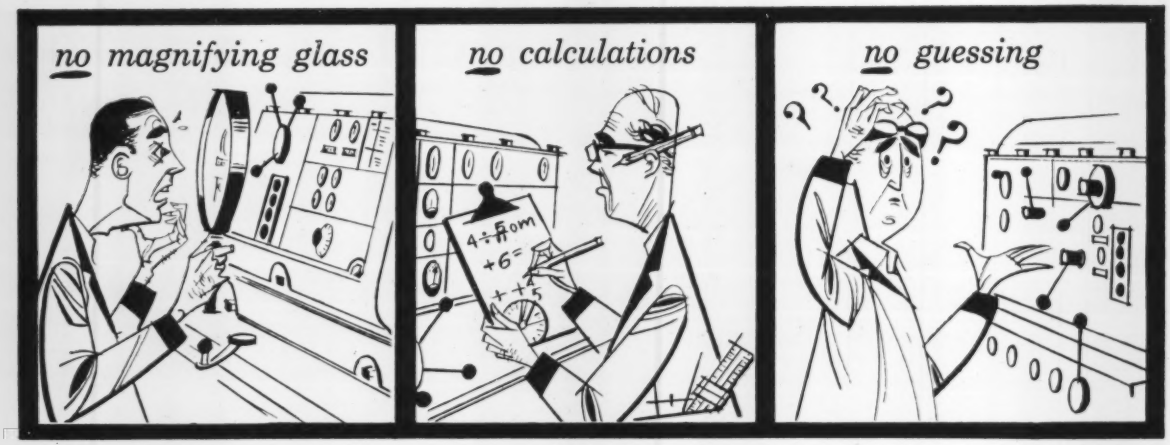
NORTON
ABRASIVES

Making better products...
to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening
Stones • Behr-cat Tapes

W-1763

Know your feed... set your speed!



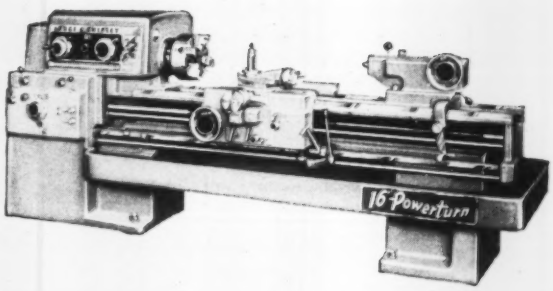
quickly . . . almost automatically with the LODGE & SHIPLEY *Powerturn* LATHE and SPEED-DIAL HEAD!

Take "by-guess" and "by-golly" confusion out of lathe operation! Lodge & Shipley POWERTURN Lathes with *Speed-Dial* Head make speed selection and setting simple as **a...b...c!**

a . . . set work diameter
b . . . read r.p.m. opposite cutting speed
c . . . set levers to automatic indicator lights

This time-saving, fool-proof simplicity is but one feature of New POWERTURN Lathes. Combined with traditional Lodge & Shipley accuracy and rugged strength are many other features for new precision and new operating convenience. New literature . . . ready now . . . tells the complete story: how POWERTURN Lathes are designed to facilitate turning to higher levels of profitable operation. 13, 16 and 20-inch sizes.

The Lodge & Shipley Company,
3055 Colerain Ave., Cincinnati 25, Ohio.



Lodge & Shipley

your LODGE-*ical choice!*

Scott Wipers are 2-ply paper sheets, welded for extra strength. They're chemically treated for proper wet strength. Their special "perf-embossed" surface makes them ideal for the toughest wiping jobs . . . such as wiping oil off a crankshaft after Magna-Flux inspection.

WIPER PROBLEM? Look what Ohio Crankshaft did with Scott Wipers!

The Ohio Crankshaft Company, Cleveland, is the world's largest manufacturer of heavy-duty crankshafts and camshafts. Two years ago, this company switched from cloth wipers to Scott Wipers. The change pleased employees, increased efficiency and saved money.

Management says: "We save over $1,000 a year by using Scott Wipers." Machine operators use them to wipe tools, stock, machines. Inspectors polish finished parts with them. Workers also prefer Scott Wipers for a variety of other wiping jobs—and they've found that minor injuries have dropped. When used fresh from their "pop-up" box, Scott Wipers carry no metal chips or particles to cut hands and faces.

Like more details? Call your local Scott man, or write: Scott Paper Company, Department S-73, Chester, Pennsylvania.

SCOTT PAPER COMPANY

Makers of the famous Scott paper products you use in your home.
Consult local TV schedules for Scott's program, "Father Knows Best."

Precision by the Truckload -- they're Blanchard ground!

This truck is loaded with 14 tons of steel. Its cargo is 33 soft steel plates, each measuring 27½" x 25½" x 11.125", and ground to ± .001" on a Blanchard Surface Grinder.

Dies up to 84" across corners, can be ground on a Blanchard at great savings. Grinding can be controlled without guesswork—leaving a flat, sharp die—as soon as the entire surface is cleaned up. Die resharpening on the Blanchard allows you to get maximum life from your valuable dies and end plates.

Ask for details on the 15 standard Blanchard models.

For best results in surface grinding . . .

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS.

THE BLANCHARD MACHINE CO., 64 State St., Cambridge 39, Mass.

Gentlemen: Please send me a free copy of "The Art of Blanchard Surface Grinding" (3rd edition) and "Work Done on the Blanchard" (5th edition)

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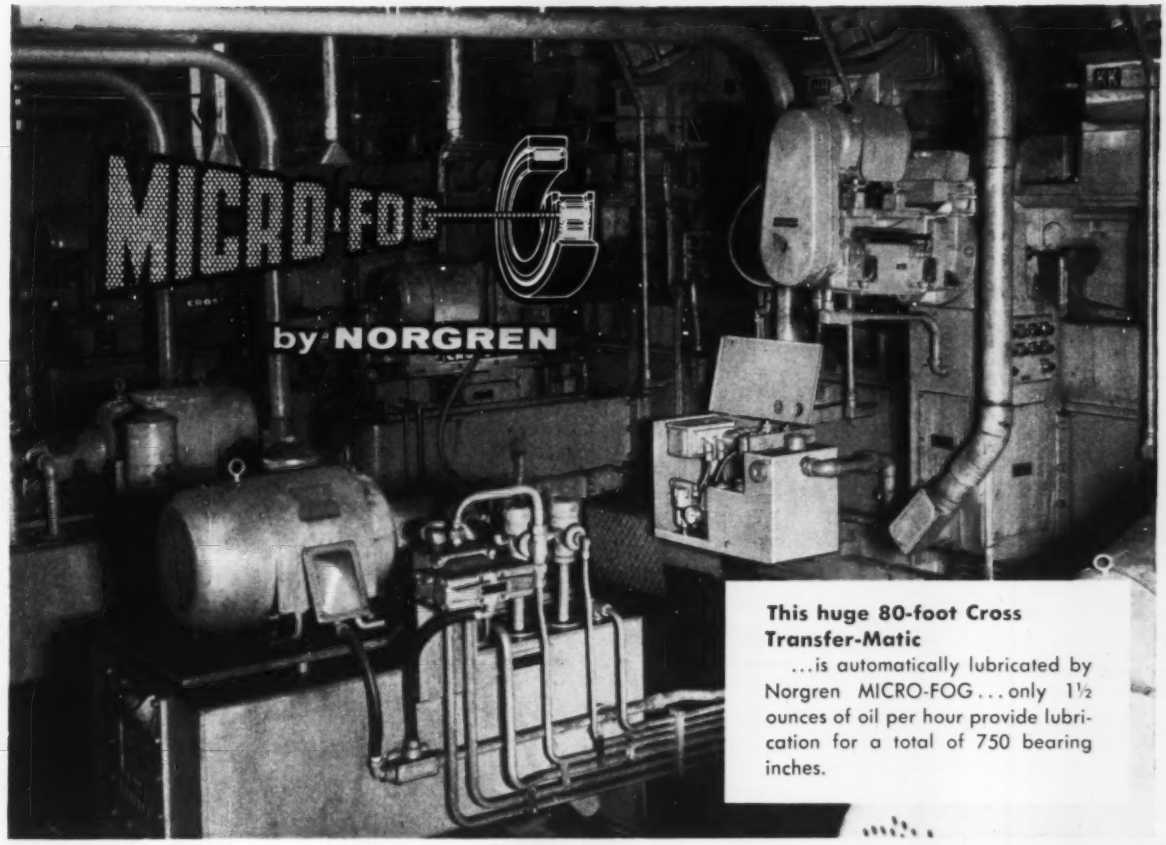
FIRM _____ CITY _____ ZONE ____ STATE _____



This huge 80-foot Cross Transfer-Matic

...is automatically lubricated by Norgren MICRO-FOG... only 1½ ounces of oil per hour provide lubrication for a total of 750 bearing inches.

AUTOMATIC *Air-Borne* LUBRICATION

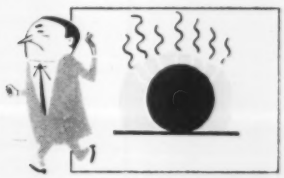
for Bearings, Gears, Chains, Cams, Slides, Ways

How Much Oil is REALLY Needed to Lubricate?

The only oil that lubricates is the thin film that separates the metal surfaces. Any additional lubricant is a waste and may even be harmful, causing over-heating due to fluid friction. With intermittent systems, there may be periods when there is not enough oil—and metal wears against metal.

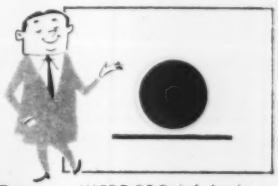
Norgren MICRO-FOG Provides Optimum Lubrication

One MICRO-FOG Lubricator automatically coats all the bearings, gears, chains and other components of a machine with a continuous, protective film of fresh oil. Just the right amount of oil—no more, no less—is continuously applied to provide the most efficient lubrication, reducing wear on machine components and cutting maintenance and replacement costs.



TOO MUCH OIL—
Hot bearings due to fluid friction.

TOO LITTLE OIL—
Bearings run hot, wear excessively.



MICRO-FOG Lubrication—
Always just the right amount of fresh oil.

For complete information, call your nearby Norgren Representative listed in your telephone directory—or WRITE FACTORY FOR NEW NO. 800 CATALOG.

C. A. NORGREN CO.

3412 SOUTH ELATI STREET ..... ENGLEWOOD, COLORADO

Save $1000 per year on every Industrial Truck you use

You might even save more. Plenty of users of *electric* industrial trucks are doing so right now. These are realistic, average savings based on all kinds of operating conditions. If your present industrial trucks aren't electric, the chances may be that you are throwing away thousands of dollars every year.

This is something that doesn't appear on the surface. Because electric industrial trucks generally have a higher price tag—like most quality merchandise. But the real cost of any industrial trucks doesn't stop when you buy them. Over the life of a truck, the operating costs might even exceed the price.

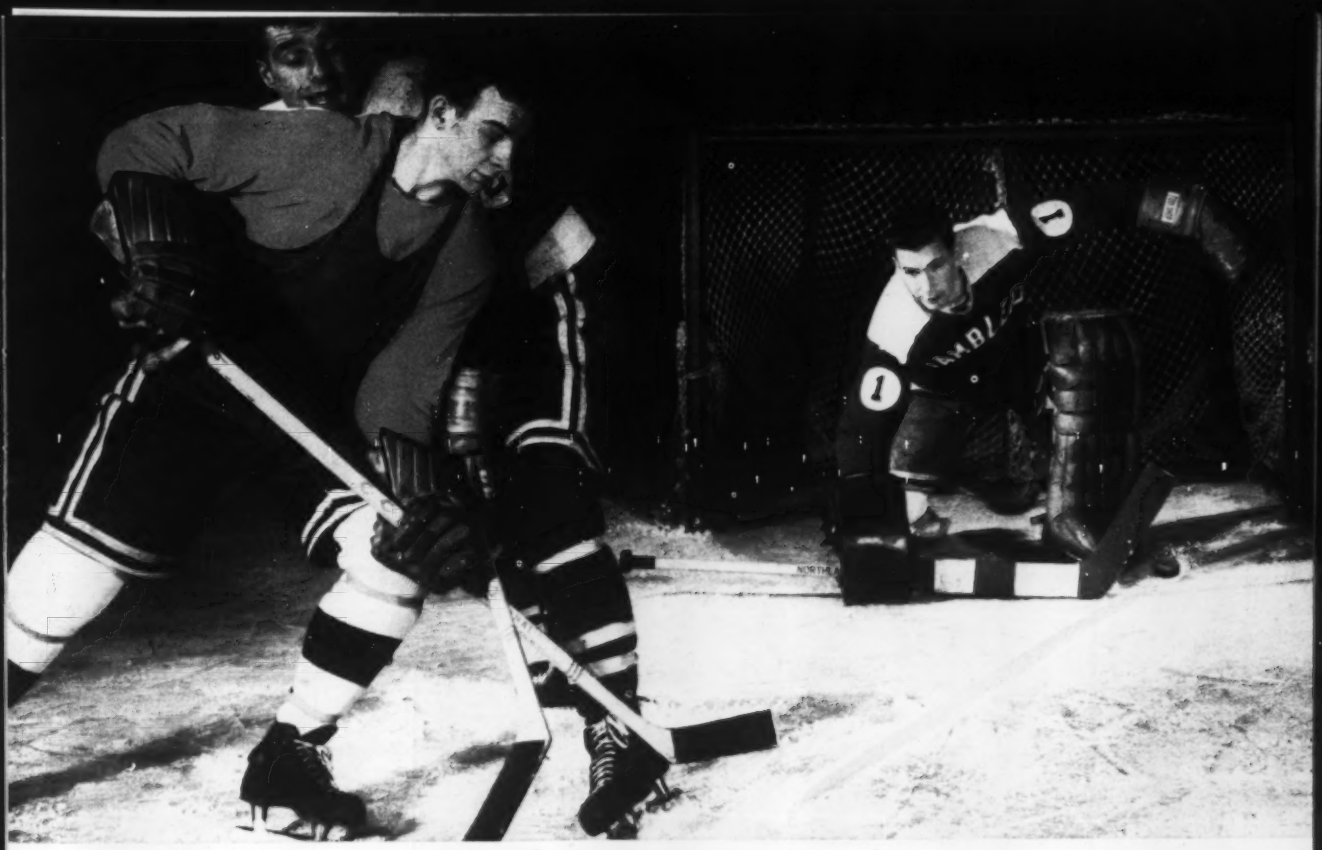
Electric industrial trucks save in the three most important areas of cost breakdown: depreciation, fuel and repair. They generally outlast other trucks from two to four times. Instead of fuel, you buy electric power—from your local electric company at low rates that have been steadily declining for years. Since the electric drive system runs cool and has so few moving parts, maintenance and repair costs alone average several hundred dollars per year less. And heavy duty batteries last for years without replacement.

In addition to their tremendous economies, electric industrial trucks offer the advantages of quiet, vibration-free operation; and virtual freedom from unscheduled downtime.

These are important considerations for up-to-date management men today. Have a talk with your nearby industrial truck dealer or salesman. He's listed in your classified telephone directory under "Trucks—industrial."

This message is presented as a service to industry by Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

THE ELECTRIC STORAGE BATTERY COMPANY **Exide®**



Winner by three points!

The goals are always in *your* favor when you have CIMCOOL® Concentrate on the job in your plant. Here's why CIMCOOL leads the league—actually is the largest selling chemical cutting fluid in the world—winning by three big points:

CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.

CIMCOOL DOES A BETTER JOB because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.

CIMCOOL IS CLEAN, doesn't soil hands or clothing. It contains no skin irritants. It leaves no slippery film on shoes, floors, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

So get in the winning column. See your CIMCOOL distributor. He'll give you full information on *all* the advantages of CIMCOOL Concentrate—as well as details on the entire family of CIMCOOL Cutting Fluids.

Or contact us direct and we'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

*Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT **Concentrates** — For jobs requiring oil-base cutting fluids. Added to mineral oils, they give economical mixes for higher speeds and feeds.

CIMCOOL **Bactericide** — The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL **Machine Cleaner** — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

How SKF Saved in 7 Ways

and at the same time improved its roller bearing cages by using the right

Revere Brass Strip

SKF Industries, Inc., Philadelphia, Pa., like other progressive organizations, is constantly seeking new ways to improve its products and at the same time cut production costs.

With this in mind they recently reviewed the kind of brass which was being used in their spherical roller bearing cages from the standpoints of quality and fabrication. It was then that Revere's Technical Advisory Service studied the problem first-hand and made recommendations to the **SKF** production and engineering departments.

SKF IMPROVED TYPE "C" Spherical Roller Bearing cut away to show how the cage, made of Revere Brass Strip, fits into the bearing. Due to its advanced internal design, this bearing provides greatly increased capacity and service life.

HERE IS "window-type" cage of SKF Spherical Roller Bearing, made in two pieces, one for each row of rollers. Cage is made from rugged Revere Brass Strip at the Shippensburg, Pa., plant of SKF Industries, Inc.

The result was the adoption of specification changes in brass strip as recommended by Revere which gave SKF these 7 money, time and tool-saving advantages:

1. One bore pressing operation has been eliminated. Machining is more easily accomplished. Less machining is required.
2. Tool life has been increased with some speeds increased up to 100% and feeds up to 30%.
3. Rework due to burrs has been greatly reduced. One step less is required in the deburring operation while savings through reduced cycle time for remaining deburring operations are up to 40%.
4. Chips are small now . . . there is no "angel hair" to clutter work area.
5. Life of punch used in notching roller bearing cage has been doubled. Now a run may be completed without making tool adjustments due to sharpening tools.
6. Machining speeds and feeds have been substantially increased over those in machining the former alloy.
7. Die setters report that considerable work has been eliminated in setting up the tools used.

And, all of these money-saving things were accomplished without sacrificing quality—in fact the quality of these roller bearing cages was *improved!*

This is still another eye-opening example of Revere supplying the metal that will do the best job and with the greatest economy . . . be it brass, copper or aluminum or any one of their alloys.

Why not call in Revere's Technical Advisory Service to review your operation? It may mean money saved with an improved product to boot.

REVERE COPPER AND BRASS INCORPORATED

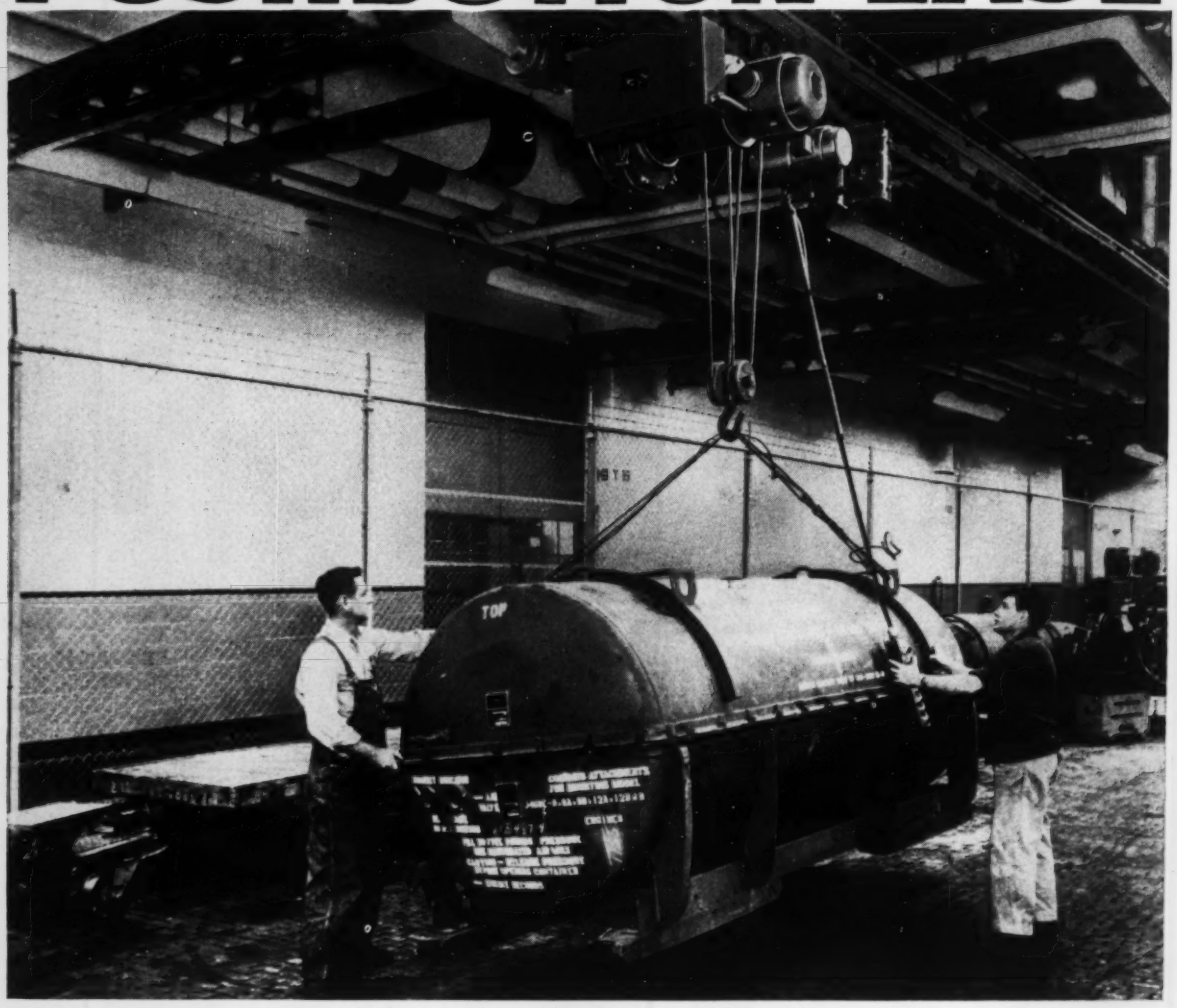
Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N.Y.

Mills: Baltimore, Md.; Brooklyn, N.Y.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Newport, Ark.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere.

COPPER * BRASS * 18 01 REVERE ALUMINUM

PUSHBUTTON EASE



EASY OPERATION OF YALE HOIST MEANS SAFE SHIPMENT OF "CANNED" JET ENGINE

Moving "packaged" jet engines to the shipping department is a smooth operation because a Yale Cable King Electric Hoist provides all the power needed for easy, safe lifting and transporting big loads. Push-button controls simplify the operation...give inch-by-inch control during lift and travel...permit accurate spotting and easy guiding of awkward loads. And, Yale's exclusive positive load brake lubrication and unique air-cooling system dissipate brake heat instantly...prevent slowdowns due to overheating. Thus—no matter how heavy the duty cycle—Yale Cable Kings stay on the job!

If your handling operations now include any lifting jobs that are difficult, time-consuming or hazardous, find out how Yale Cable Kings can increase the efficiency and safety factor in your factory or shop. Capacities from ¼ to 15 tons in all types of suspensions. For full facts, contact your local Yale Hoist Distributor (he's listed in the Yellow Pages of your phone book under Hoists) or write The Yale & Towne Manufacturing Company, Philadelphia 15, Pa., Dept. A-83.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U. S. PAT. OFF.

Gasoline, Electric & LP-Gas Industrial Lift Trucks • *Worksavers* • Warehousers • Hand Trucks • Hand and Electric Hoists

The very high strength of USS "T-1" Steel has helped Athey Products Corporation, Chicago, Illinois, to solve the problem of providing a high-volume trailer for hauling lightweight materials such as bauxite ore. This new rear-dump trailer is bigger than conventional units, yet...

WEIGHS 3½ TONS LESS

The very high yield strength of USS "T-1" Steel—90,000 psi minimum—enabled Athey to increase working stresses and reduce the thickness and weight of drawbar and draft frame structure and of all load-containing body plates. As a result, this unit weighs just 26,000 pounds—7,000 pounds less than conventional units—and, consequently, it . . .

TRAVELS FASTER

It can make empty trips much faster . . . can negotiate steep grades in one higher transmission speed than conventional units. Even with a full load of 35 tons, this lightweight unit can climb 14% grades in second gear. By reducing weight, USS "T-1" Steel speeds operations, cuts non-productive time, and makes possible a larger trailer that...

CARRIES MORE PAYLOAD

This trailer has the lowest ratio of vehicle weight to load weight ever designed . . . and carries a full 30.5 cu. yds.—8 yards more than conventional units of the same weight-carrying capacity. It promises to increase, materially, the efficiency of hauling *lightweight* materials . . .

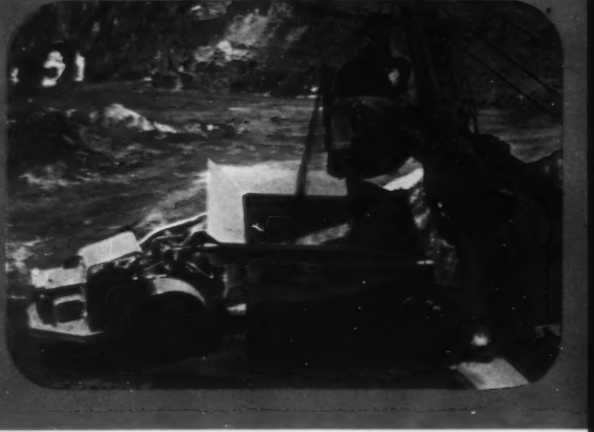
THANKS TO USS "T-1" CONSTRUCTIONAL ALLOY STEEL

USS "T-1" Steel's toughness and resistance to impact abuse assure Athey the ruggedness and durability needed in off-road mountain service. Its excellent weldability kept fabrication simple.

USS "T-1" Steel can help you in a wide variety of heavy-duty applications. Get complete facts—call our nearest sales office, or write to: United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS

See The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your newspaper for time and station.



UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

Roll is shown at Homestead Forgings Division of United States Steel being bored, prior to heat treatment and reaming. Machine is 48″ center drive, double end boring lathe.

Glass melting tank is at left. Forged Stainless rolls squeeze the viscous glass between them before it enters annealing lehr. ▼

PPG rolls glass at 2000°F with USS Stainless Steel rolls

In a sizzling race to keep up with the demand for flat glass, Pittsburgh Plate Glass Company is rapidly building new factories and increasing the output of old ones. But you cannot increase the output of an existing factory unless you can somehow get more glass from the melting tanks.

Since plate glass must pass between a pair of rolls as it emerges from the tank, the rolls must turn faster when production is increased. If they turn faster, it is more difficult to dissipate the heat from the molten glass. The answer is better rolls. And when you're thinking in terms of better rolls for hot work, stainless steel forgings are the answer.

Pittsburgh Plate has found that USS Quality Forging rolls have suitable physical properties and microstructure that are so necessary for this job. They are made from Type 410 Stainless Steel, and are remarkably resistant to surface cracking and checking. The rolls are water cooled internally, and there is naturally a steep temperature gradient from O.D. to I.D. The forged rolls resist pitting and oxidation. They retain their dimensions during the 24-hour-a-day glassmaking process.

Pittsburgh Plate has had one set of these rolls in continuous service for two years, and they have already produced *millions* of square feet of glass. Similar rolls will also be installed in their revolutionary new Cumberland, Md. plant.

Write today for our free booklet that describes USS Quality Forgings. Address inquiries or requests for the booklet to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

USS

heavy machinery parts—carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

UNITED STATES STEEL

To meet rugged service conditions— a refractory concrete dome made with ATLAS * CEMENT

Three-year service life was obtained at this plant by a previous furnace dome made with the same materials. This 17' diameter hardening and annealing furnace inner dome is made with a castable refractory containing Atlas Lumnite cement — A.P. Green "Kast-Set." Heat passes through 289 easily formed 5" round holes, heating concrete on both sides. Installed by Lindberg Combustion, Chicago, Ill., for the Englander Co., Inc., Birmingham, Ala.

- Lumnite-made refractory concrete resists extreme variations in temperature and thermal shock due to rapid heating and cooling.
- Durability under severe operating conditions is assured.
- Placement is fast and easy – service strength is reached within 24 hours.

For maximum convenience, use Lumnite-made castables. These are pre-mixed, ready for use, and are made by leading manufacturers of refractories. For more information, write: Universal Atlas, 100 Park Avenue, New York 17, N. Y.

UNIVERSAL ATLAS CEMENTS

USS

* **"LUMNITE"** is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

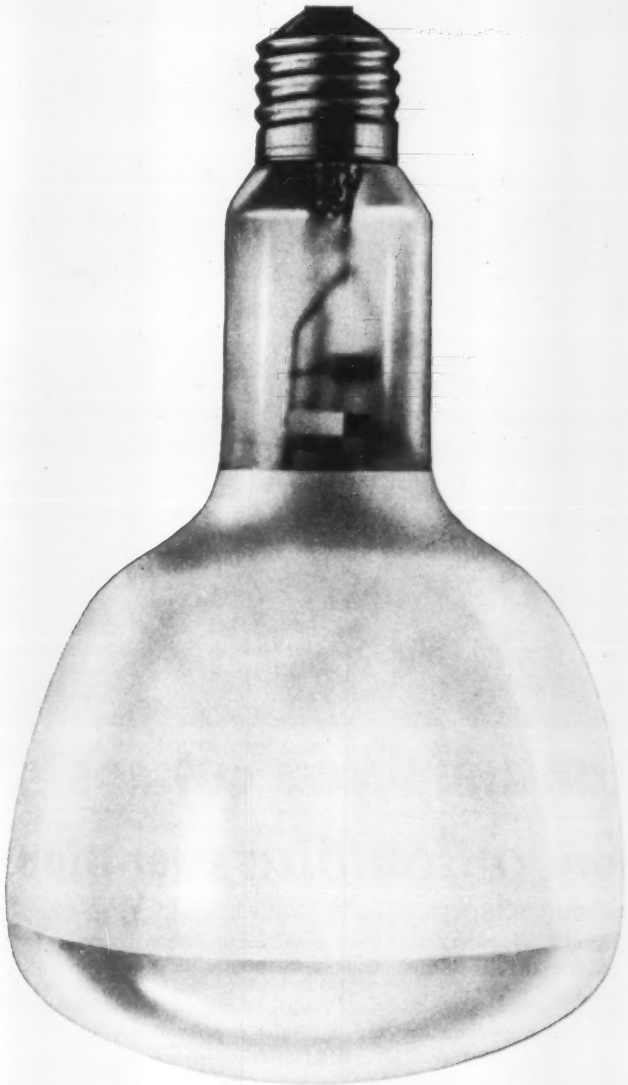
L-145

UNIVERSAL ATLAS CEMENT COMPANY—member of the industrial family that serves the nation—**UNITED STATES STEEL**

OFFICES: *Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco*

Switch to this new General Electric

WHITE MERCURY LAMP



YOU can use the new General Electric *White Mercury* Reflector Lamps *in your present 400-watt mercury equipment* with no change or added investment in operating equipment.

1 GET UP TO 63% MORE LIGHT ON WORK FROM YOUR PRESENT FIXTURES: Because a brand new phosphor generates more white light than ever before you get from 7% to 63% more light on the work, depending upon the lamp type you are replacing. (See below).

2 GET UP TO 33% LOWER COST OF LIGHT IN YOUR EXISTING INSTALLATIONS: With this increased efficiency your unit cost of light can go down from 7% to 33%. (See below)!

3 GET LOWER INITIAL COST FOR NEW INSTALLATIONS: You can get *more* light from the same number of fixtures, or get *equal* light with up to ⅓ *fewer* fixtures!

You get all this with new General Electric *White Mercury* Reflector Lamps because of a specially designed strontium magnesium orthophosphate phosphor. This phosphor converts ultra-violet radiation into more white light than ever possible before. It's also an efficient reflector—sealed in against dirt and fumes.

Gain these advantages *now*. Replace your present mercury lamps with the new G-E H400 RW-1. Also available in the bulged tubular shape, the H400 EW-1. For more information write: General Electric Large Lamp Dept. S-3, Nela Park, Cleveland 12, Ohio.

ADVANTAGES OF NEW G-E *WHITE MERCURY* OVER OTHER G-E 400-WATT MERCURY LAMPS

NEW RW-1 vs A-1 (clear glass)

- 55% to 63% more light to the work
- 27% to 33% lower cost of light
- Less maintenance
- Whiter "Color"

NEW RW-1 vs E-1 (clear glass)

- 28% to 31% more light to the work
- 16% to 23% lower cost of light
- Less maintenance
- Well suited for use in upward light fixtures
- Whiter "Color"

NEW RW-1 vs J1 (color improved)

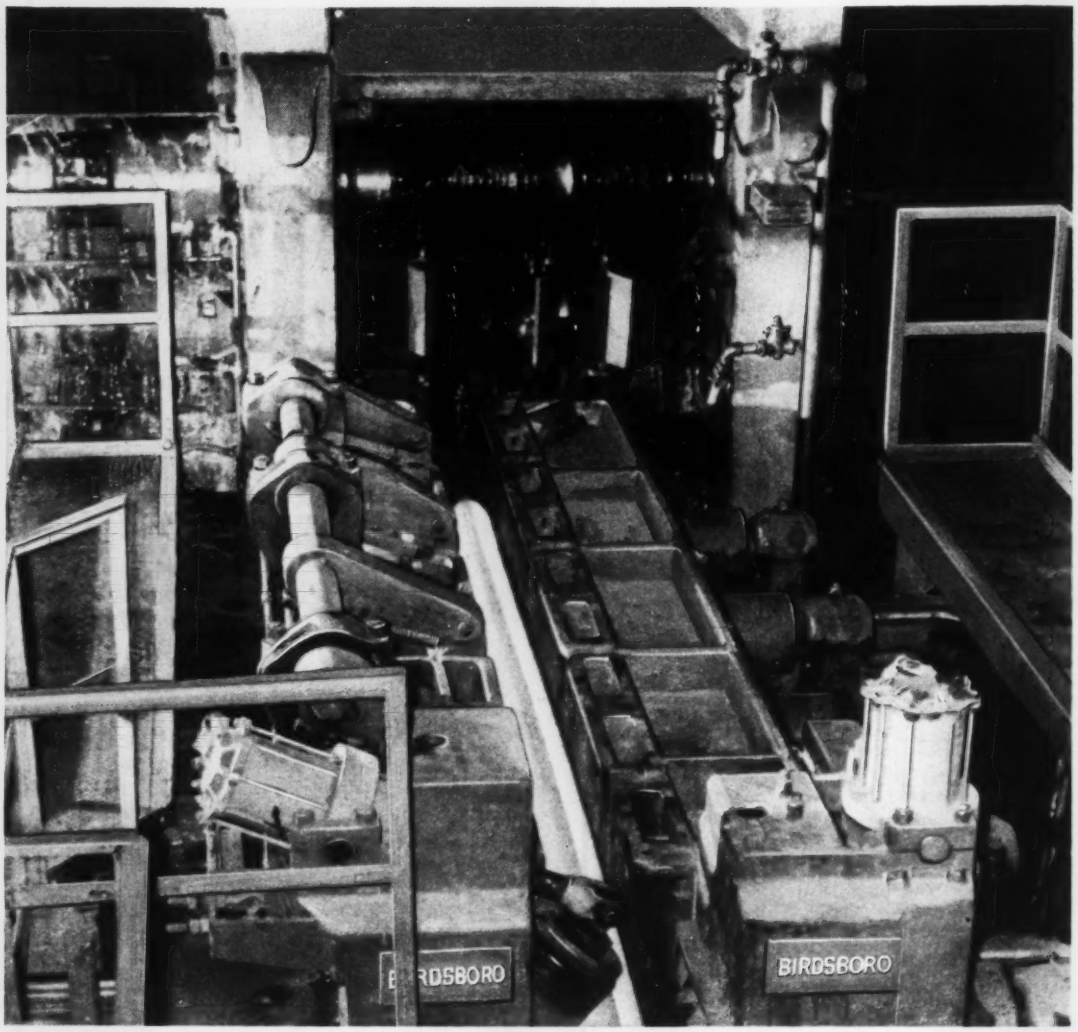
- 37% to 40% more light on the work
- 24% to 30% lower cost of light
- Less color improvement

NEW RW-1 vs RC1 and R1 (reflector shape)

- About 7% more light on the work
- 7% lower cost of light
- Less color improvement for RC-1 users

Progress Is Our Most Important Product

GENERAL ELECTRIC



BIRDSBORO can help you cut costs

with more *automatic* operation

Tonnage from this BIRDSBORO 3-high mill is raised substantially by semi-automatic features. These include tilting table, side guard manipulators, finger lift for turning square and rectangular shapes, and auxiliary manipulator for turning diamonds and squares.

Savings in labor costs, higher quality and dependable performance are other advantages you can count on when you call in BIRDSBORO engineers for anything from a single unit to a complete plant.

MM-42-55

BIRDSBORO

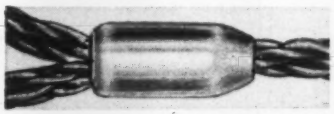
STEEL FOUNDRY AND MACHINE CO.

BIRDSBORO, PA. District Office: Pittsburgh, Pa.
Engineering Subsidiary: Engineering Supervision Co., 120 W. 42nd St., New York 36, N.Y.

STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Tuffy® Sling Bulletin

Reporting the Outstanding Performance of Union Wire Rope's Machine-Braided Wire Fabric Slings.

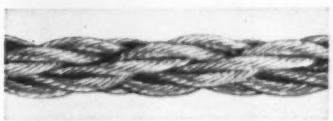


Streamlined Ferrules — Pressed On Over Tucked-In Splices — Give Tuffy Eyes Full Strength of Sling

It's on all Tuffy slings, and it doesn't cost you a penny extra. No sling ferrule like it anywhere! The ferrule is set on the eye splice under pressure so great that the eye splice has the full strength of the Famous Tuffy machine-braided wire fabric. It makes Tuffy slings stronger and safer. And still another advantage: because Tuffy slings are easier and safer to load, they're also faster to load. Yet Tuffy super-strong, super-flexible slings cost you no more than ordinary slings.

Hardly Ever Does a Kink Put a Tuffy on the Blink!

Try to kink a Tuffy sling — with all the force you can apply with two hands and the help of your feet. Chances are you'll need a vise. If you do succeed in putting a kink in that 9-part machine-braided wire fabric, you can straighten it out quickly and without materially damaging the fabric.



Tuffy Machine-Braided Wire Fabric — Successor to Wire Rope in Slings

Ordinary wire rope had the strength required for sling loads, but fell far short on the important qualities of flexibility, kink-resistance and ease of handling. Tuffy's patented 9-part machine-braided fabric combines super flexibility with extra toughness — costs no more than ordinary slings — and has uniformity of construction impossible to get in costly hand-braided slings.

Your Tuffy Distributor is Qualified to Help You Get More Service per Dollar from Slings and Hoist Lines

Send for FREE Tuffy Handbook of Slings and Fittings

For Canada, Safety Supply Co., Toronto

Distributors Fill Orders Fast on 16 Factory-Fitted Tuffys

Tuffy slings are factory-fitted, factory packaged and easy to order. They are delivered to you as a complete package — ready to go to work right now. Your distributor is ready to serve you, and he's backed up by his nearby Union Wire Rope depot.

No Complicated Specifications in Figuring and Ordering Your Tuffy Needs

Tuffys are tailored to special uses. Just select the Tuffy sling made for the type of load you're handling and (1) specify name — Tuffy; (2) specify type (U-1, U-2, etc.,); (3) specify diameter and length of fabric wanted. Special fittings are equally easy to order.

Tuffy Hoist Line Teams Up with Tuffy Slings

Tuffy Hoist Line is a special rope construction for hoisting on all types of over-head, stiff leg and mobile cranes, derricks and clamshells. Use it with Tuffy slings for a perfect working pair.

union Wire Rope **corp.**

2160 Manchester Avenue, Kansas City 26, Mo.

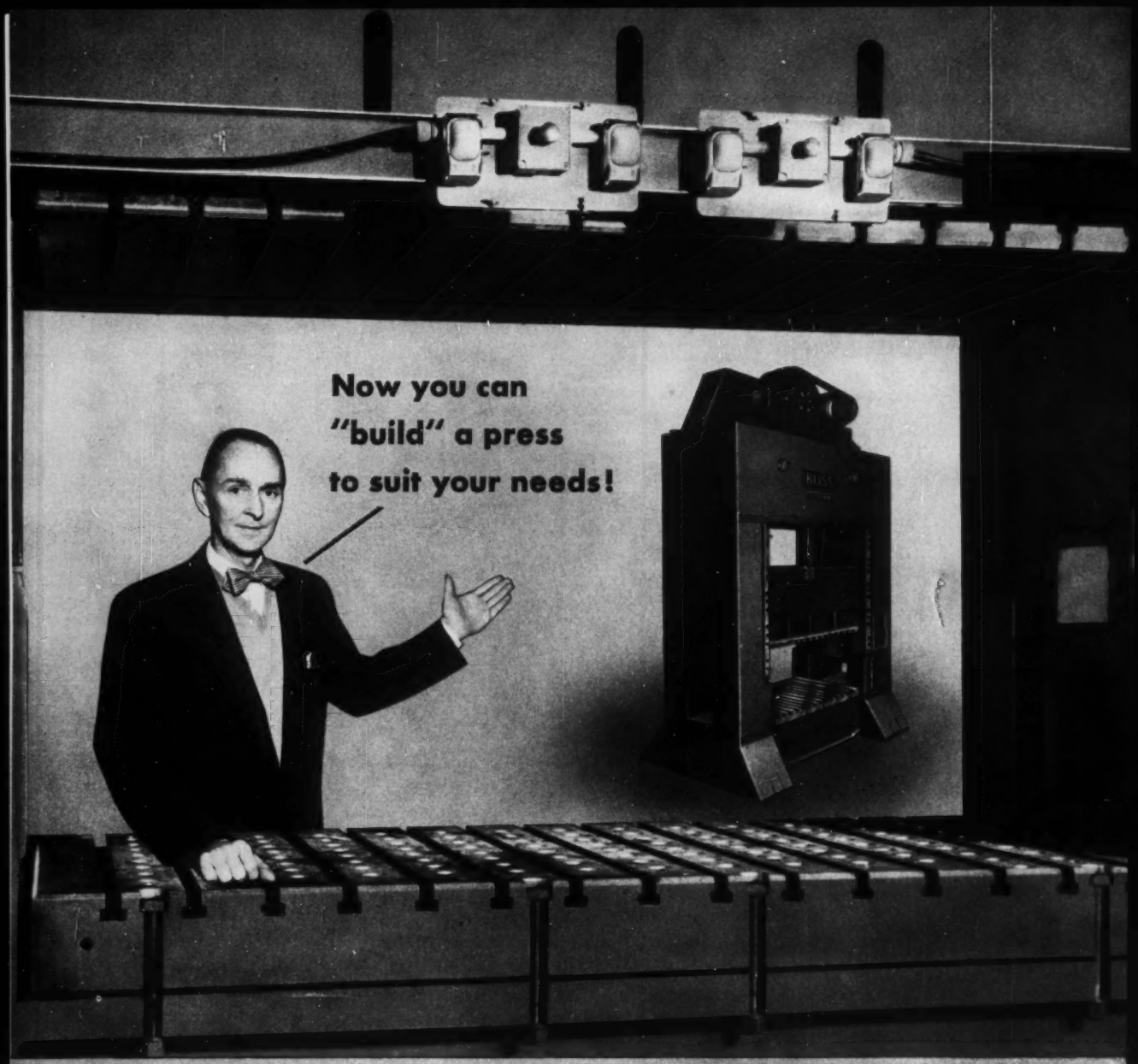
Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

MY NAME_____ TITLE_____

COMPANY NAME_____

ADDRESS_____

2. CITY_____ ZONE____ STATE_____



Why buy a press designed for someone else?

To these basic design advantages of the new Bliss SE-2 press . . .

- Enclosed design, all-welded construction, four-piece frame with tie rods drilled for electrical shrinking
- Recirculating oil system for gears, shafts, bearings, slide adjustment and *flywheel roller bearings*
- Bronze liners on the slideways running against lubrized cast iron gibs
- Motorized slide adjustment
- Counterbalance tanks
- JIC sizes
- Anti-friction bearings on *intermediate shaft* as well as on flywheel

. . . you can add any or all of these optional features

- Provision for automation controls and feeds
- Inbuilding
- Recirculating oil to the slide gibs
- Recirculating oil to the cushion gibs
- Automatic lubrication to counterbalances and cushion internals
- Air and electrical maintenance outlets
- Die lights
- Air control manifolds
- Special controls

A Bliss Chief Engineer tells...

How press buyers can "tailor" Bliss' new eccentric-gear design to fit their own needs!

"It's almost impossible to design a large press to please everyone. Yet that's exactly what we have tried to do with our new one point, two point and four point presses," says Chief Engineer Bill Staecker, of Bliss' Canton Plant.

"Here is how we approached the problem. Our field sales engineers worked for months with customers' operating executives and our press designers. On the one hand were the widely varying requirements of the big automated mass-production stamping plants; on the other, the needs of the job shops who use their presses for short runs. It was rare to find two sets of requirements alike.

"Flexible" design proves answer

"It was apparent that what was needed was a *flexible* basic design—a press that could have features added or subtracted to meet any user's needs without making him pay for features he didn't want. You can see how we have solved the problem by looking at the table of specifications at the left.

New drive cuts maintenance

"But...above and beyond the benefits of this basic design, these new Bliss presses have a 'unitized' drive mechanism based on a special *demountable* flywheel and outboard clutch. To get an idea of what this unitized design does for maintenance, consider these facts:

"Except for the main gears, nothing is built into the crown. The entire drive can be removed as a unit. Belts can be replaced without removing anything but the brake pins. And the entire clutch can be taken off simply by removing the brake bracket.

"You can see what this ease of disassembly and reassembly means when you compare it to maintenance steps on your present enclosed presses."

To sum up, when you buy one of these new presses, you pay for just what you need *and no more*. And you're buying the only fully-enclosed straight side press that is truly easy to maintain.

The new Bliss eccentric-gear presses are available in a full line of tonnages in both double and single geared models. For full details, write us today.

BLISS
SINCE 1857

100 years of making metals work for mankind

E. W. BLISS COMPANY, CANTON, OHIO
PRESSES, ROLLING MILLS, ROLLS, SPECIAL MACHINERY

U. S. Plants: **Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; San Jose, California; Midland and Pittsburgh, Pa.; Branch Offices throughout the country.**

Crucible gives you
wide selection,
dependable delivery of

Cold Rolled Specialty Steels

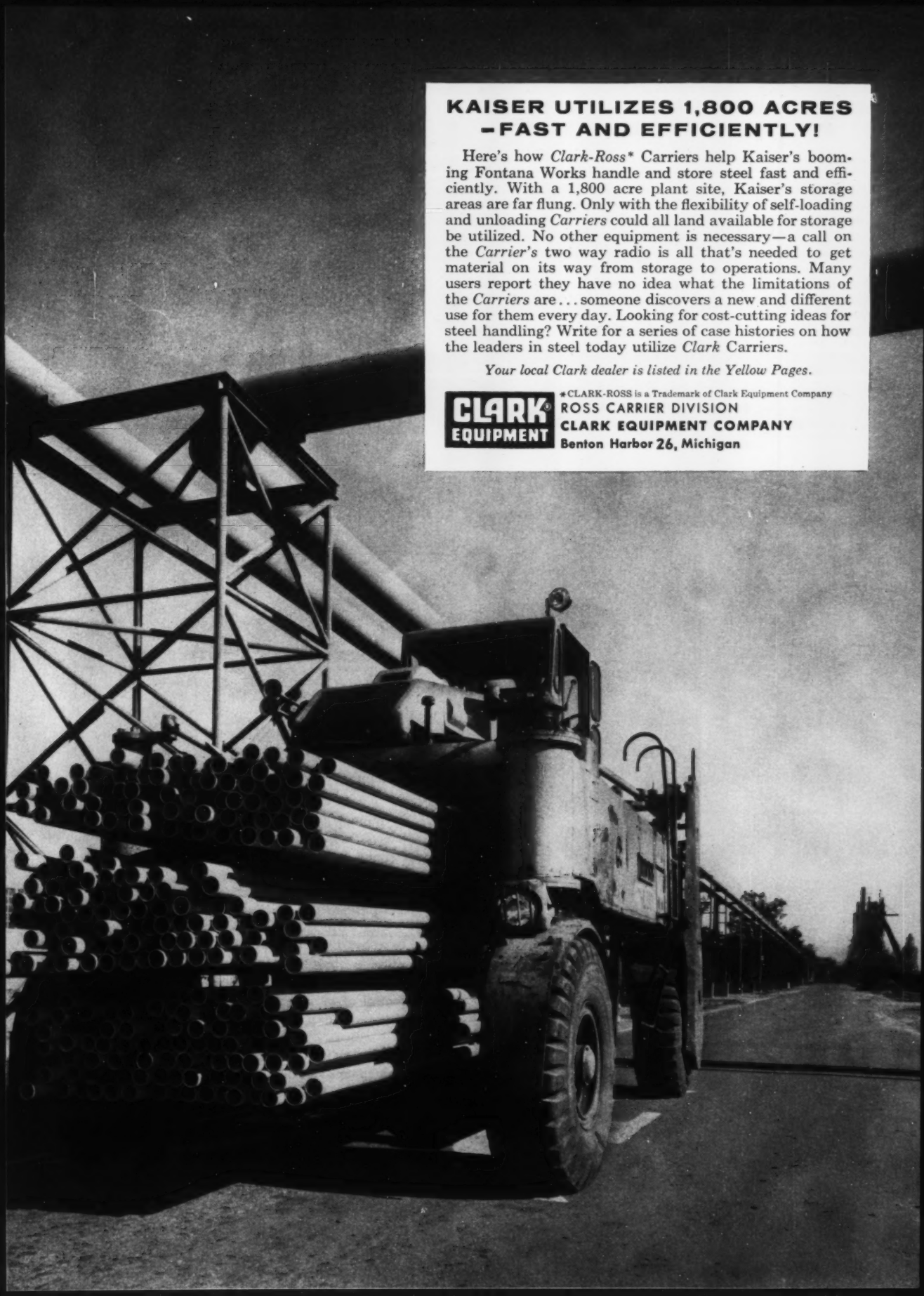
For a *full* selection of cold rolled specialty steels — call Crucible. Deliveries are on-schedule — in the size, grade, finish or length you need.

And Crucible's new mill facilities mean closer control of rolling . . . insure greater physical uniformity . . . fine finish . . . better edges . . . flatter strip.

Whether you use carbon spring steel, alloy strip steel, or many other ferrous analyses that can be cold rolled, you can't beat Crucible. More information is contained in the 32-page booklet, "Cold Rolled Specialty Steels". Write for your free copy now. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



KAISER UTILIZES 1,800 ACRES –FAST AND EFFICIENTLY!

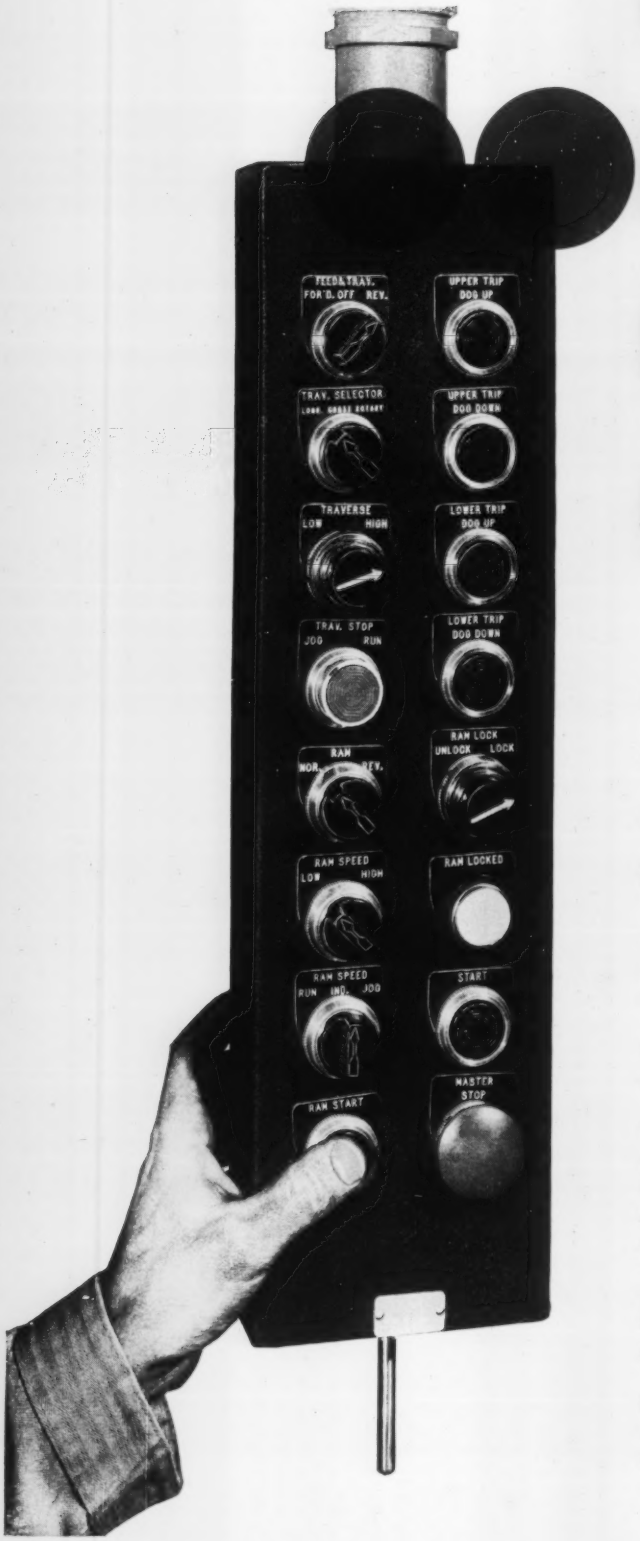
Here's how *Clark-Ross** Carriers help Kaiser's booming Fontana Works handle and store steel fast and efficiently. With a 1,800 acre plant site, Kaiser's storage areas are far flung. Only with the flexibility of self-loading and unloading *Carriers* could all land available for storage be utilized. No other equipment is necessary—a call on the *Carrier's* two way radio is all that's needed to get material on its way from storage to operations. Many users report they have no idea what the limitations of the *Carriers* are... someone discovers a new and different use for them every day. Looking for cost-cutting ideas for steel handling? Write for a series of case histories on how the leaders in steel today utilize *Clark* Carriers.

Your local Clark dealer is listed in the Yellow Pages.

CLARK® EQUIPMENT

*CLARK-ROSS is a Trademark of Clark Equipment Company

ROSS CARRIER DIVISION
CLARK EQUIPMENT COMPANY
Benton Harbor 26, Michigan



push button control

speeds operation and set-up on new Rockford **hydraulic** slotter

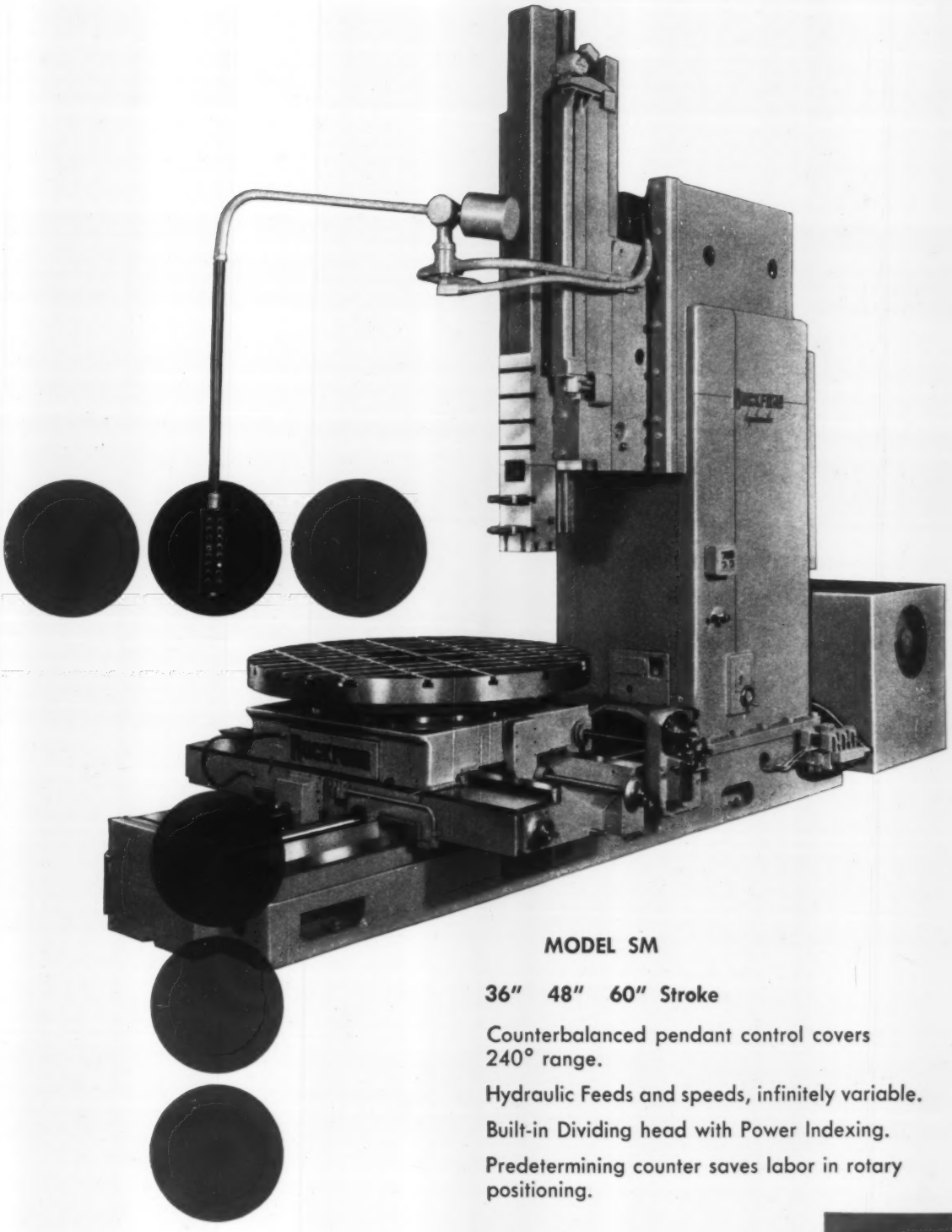
All longitudinal, transverse and rotary movements are selected and operated from the push button station of this new Rockford hydraulic Slotter.

The ram lock is pendant operated and ram stroke length and position are completely push button controlled.

Two-speed table traverse is available, enabling the machine operator to position the work to a few thousandths, without manual movements, although manual control of all movements is available from either side of the machine.

Full hydraulic drive provides two cutting ranges, one for high speeds and low cutting forces; the other for slow speeds and heavy cuts.

Get full details on this new hydraulic slotter from any Rockford Machine Tool Co. representative, or write directly to us.



MODEL SM

36" 48" 60" Stroke

Counterbalanced pendant control covers 240° range.

Hydraulic Feeds and speeds, infinitely variable.

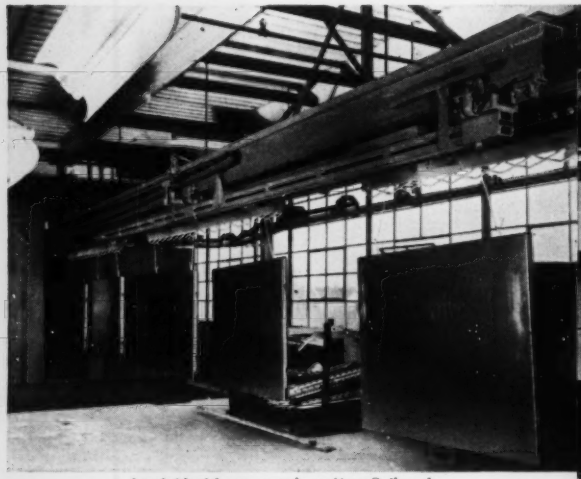
Built-in Dividing head with Power Indexing.

Predetermining counter saves labor in rotary positioning.

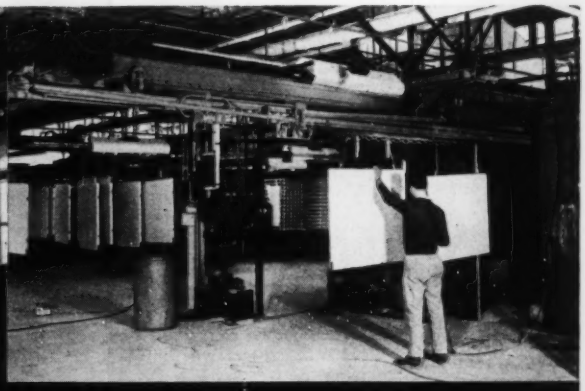
ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

HYDRAULIC

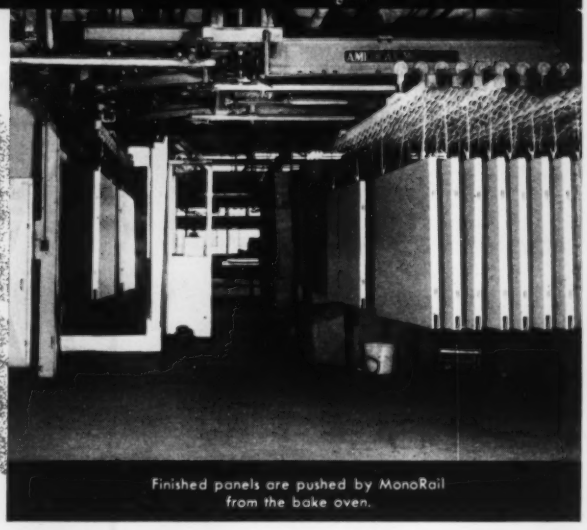


Landahl picks up panels as MonoRail pushes them from degreasing.



MonoRail pneumatically pushes a "car" of panels into a finish spray booth.

Automatic Finishing with Power LANDAHL and AMERICAN MONORAIL



Finished panels are pushed by MonoRail from the bake oven.

Space was saved and automatic finishing achieved by combining two overhead handling systems.

American MonoRail cars carrying metal panels move through degreasing, priming, finishing and baking. In each operation either loading or unloading is performed automatically by power — the Landahl Chainless Conveyor acting as a "pusher" over most of the system.

Here is "team work" engineering to take advantage of the flexibility of both American MonoRail and Landahl Chainless Conveyors.

This efficient system is installed at Fostoria, Mfg. Co., Fostoria, Ohio, for finishing metal panels for office partitions.

For details on how American MonoRail or Landahl Conveyors can cut your handling costs, write today.

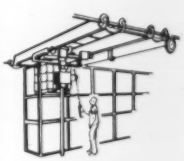
Member of The Materials Handling Institute, Inc. & MonoRail Manufacturers' Association.

For Power Driven Conveyors, Use Landahl Chainless Conveyors

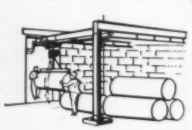
AMERICAN
MONORAIL
COMPANY

13102 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)

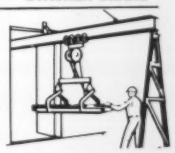
AUTOMATIC DISPATCH



STACKER CRANE



MANUAL MONORAIL



RETRACTABLE CRANE

For Years of Repeat Performance

specify SANDVIK SPRING STEEL

Sandvik Steels have a record of success in applications which demand years of consistent, continuous performance.

In products such as clock and watch springs, compressor valves, piston ring springs, vibrator reeds . . . wherever fatigue life is *vital*, you'll find Sandvik untiring in service.

If your product requires high fatigue life, fine surface finish, uniform physical properties and accurate gauge, try Sandvik.

You can get Sandvik strip steels:

- **In special analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock—also slitting facilities available.**

Ask your nearest Sandvik office for further information or technical assistance.

SANDVIK SWEDISH SPECIALTY STRIP STEELS

are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical, etc. • Razor Blades • Shock Absorbers • A Wide Variety of Springs • Trowels • Reeds: Vibrator, Textile, etc., • Piston Ring Segment and Expanders • and many other applications

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SS-105

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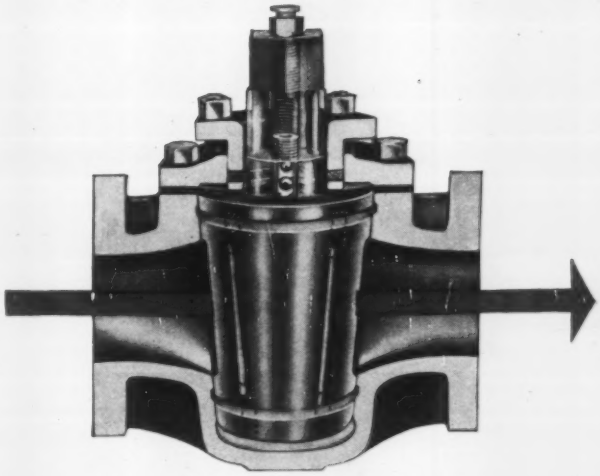
CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Straightway

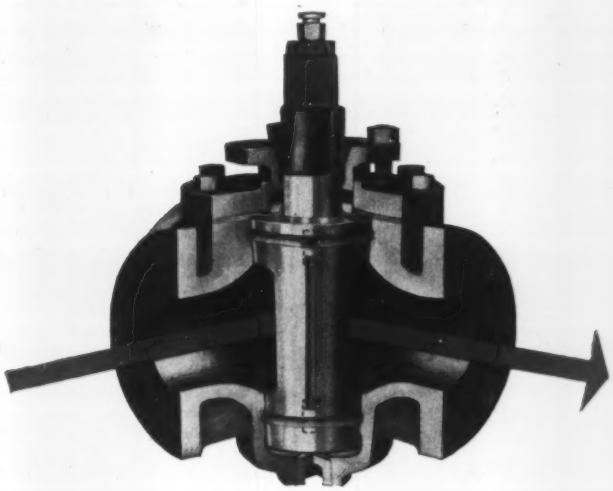
Leakproof Rockwell-Nordstrom Straightway valves cost you no more to buy and far less to use than any other valve. The exclusive Sealdport* lubrication system saves you important dollars in maintenance by eliminating the metal-to-metal friction that wears out other valves so quickly. Expensive seating problems are eliminated on even the toughest service because the Rockwell-Nordstrom valve seats are never *exposed* to the line fluid. Available in a complete range of sizes and pressure ratings in steel, semi-steel, stainless and other corrosion resisting metals.

*Registered trade mark, Rockwell Manufacturing Co.



Two ways to
Cut Your Valve Costs

ROCKWELL-Nordstrom Straightway and Multiport **VALVES**



Multiport

For such services as tank switching, relief, and blending, Rockwell-Nordstrom Multiport valves stop or change flow on three or four lines. You not only get perfect flow control but you save the cost of three or four ordinary valves . . . piping arrangements are simpler and less costly, too. Lubrication and unexposed seating assure lowest maintenance—longest service, just as in the Straightway pattern above. Rockwell-Nordstrom Multiport valves are available in semi-steel, steel, stainless and corrosion resisting metal in a wide range of pressure ratings and sizes to 16″. Rockwell Manufacturing Company, Pittsburgh 8, Pa. *Canadian Valve Licensee:* Peacock Brothers Limited.

SEND COUPON FOR MORE DETAILS

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Nordstrom
VALVES

Lubricant Sealed for Positive Shut-Off

ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pennsylvania

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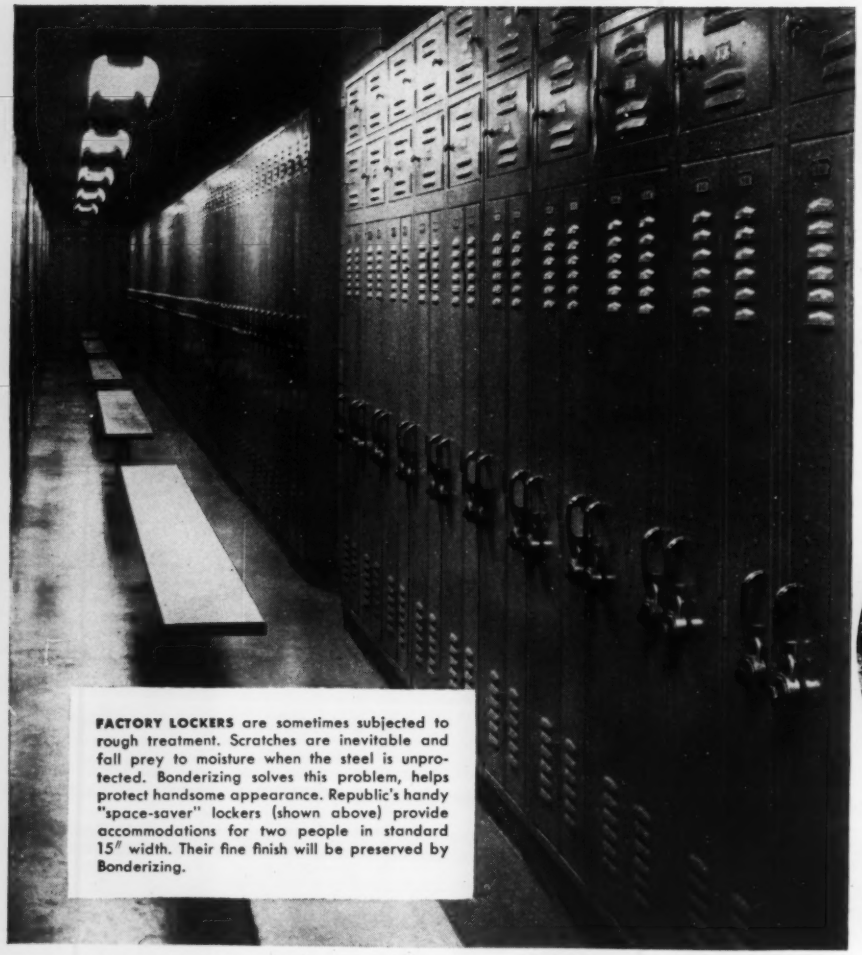
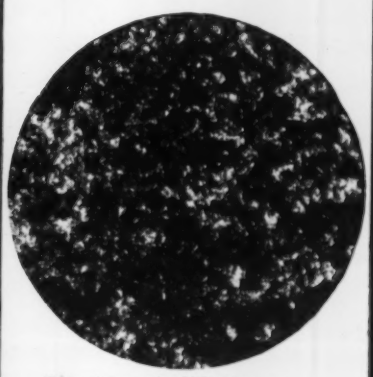
NOW...Republic Steel Lockers to preserve fine finish



FACTORY LOCKERS are sometimes subjected to rough treatment. Scratches are inevitable and fall prey to moisture when the steel is unprotected. Bonderizing solves this problem, helps protect handsome appearance. Republic's handy "space-saver" lockers (shown above) provide accommodations for two people in standard 15″ width. Their fine finish will be preserved by Bonderizing.

Photomicrograph, 100 times enlarged, of a piece of plain sheet steel. The surface is glossy smooth with no porosity to give the finish a foothold.



Photomicrograph, 100 times enlarged, of Bonderized steel. The surface is crystalline phosphate. Enamel will penetrate microscopic pores, dry, and become securely anchored to the metal.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

are BONDERIZED and protect against rust

Bumps, scratches, moisture—whatever the punishment, a Republic Steel Locker can take it and still retain a glistening, handsome finish that will not chip, peel or flake off.

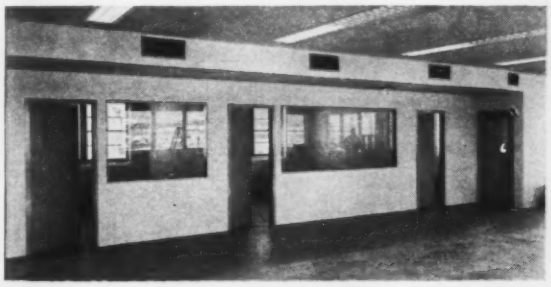
That's because the steel is now Bonderized to provide a superior base for anchoring the enamel finish to the steel surface and, at the same time, to guard against the spreading of under-finish corrosion which eventually causes peeling and flaking.

Republic Standard Steel Lockers offer three locking systems—are available in many types and sizes for every conceivable storage requirement.

One of the world's biggest locker manufacturers, Republic's Berger Division has behind it more than 65 years of locker-making know-how—plus thousands of successful installations. This is the kind of experience you can always depend on when you want the best in lockers.

Berger offers business and industry a complete planning and installation service, too—from technical planning and engineering assistance to full responsibility for proper installation—right down to the final bolt. Get the facts from your Berger representative. Or mail coupon for illustrated booklet giving specifications and prices.

THE WORLD'S STRONGEST SHELVING is Republic Wedge-Lock, made by Berger. It actually gets stronger as weight increases; permits extremely high stacking where floor space is limited. This popular shelving is widely used throughout industry for the storage of bulky, heavy items. Berger's shelving experts will be glad to help you plan your shelving arrangement. Send coupon for facts.



BONDERIZED TRUSCON STEEL DOORS CAN BE PAINTED TO MATCH any color decor. They refuse to stick or bind because steel can't swell or warp. Perfect for factory offices. Truscon makes sound-deadened Interior Swing Doors and Sliding Doors that glide noiselessly on nylon rollers. Send coupon for literature.

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Cleveland 27, Ohio

Please send me information on:
☐ Republic Steel Lockers with new Bonderizing
☐ Republic Steel Shelving
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and Steel Products

ATLANTIC STEEL CO.
gets work done fast . . . and cheaply . . . with
BROWNHOIST CRANE

Working with magnet, hook or bucket, this Brownhoist 30-ton Diesel Electric locomotive crane equipped with electric swing (shown here in the Atlantic Steel Co. yards) is typical of the hundreds of Brownhoist cranes that are doing—and have been doing—a tremendous amount of work rapidly and with economy throughout American Industry for the past 75 years.

BROWNHOIST

197

BROWNHOIST MATERIALS HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

SUBSIDIARY OF Penn-Texas CORPORATION

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • **DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago; Montreal, Canada**
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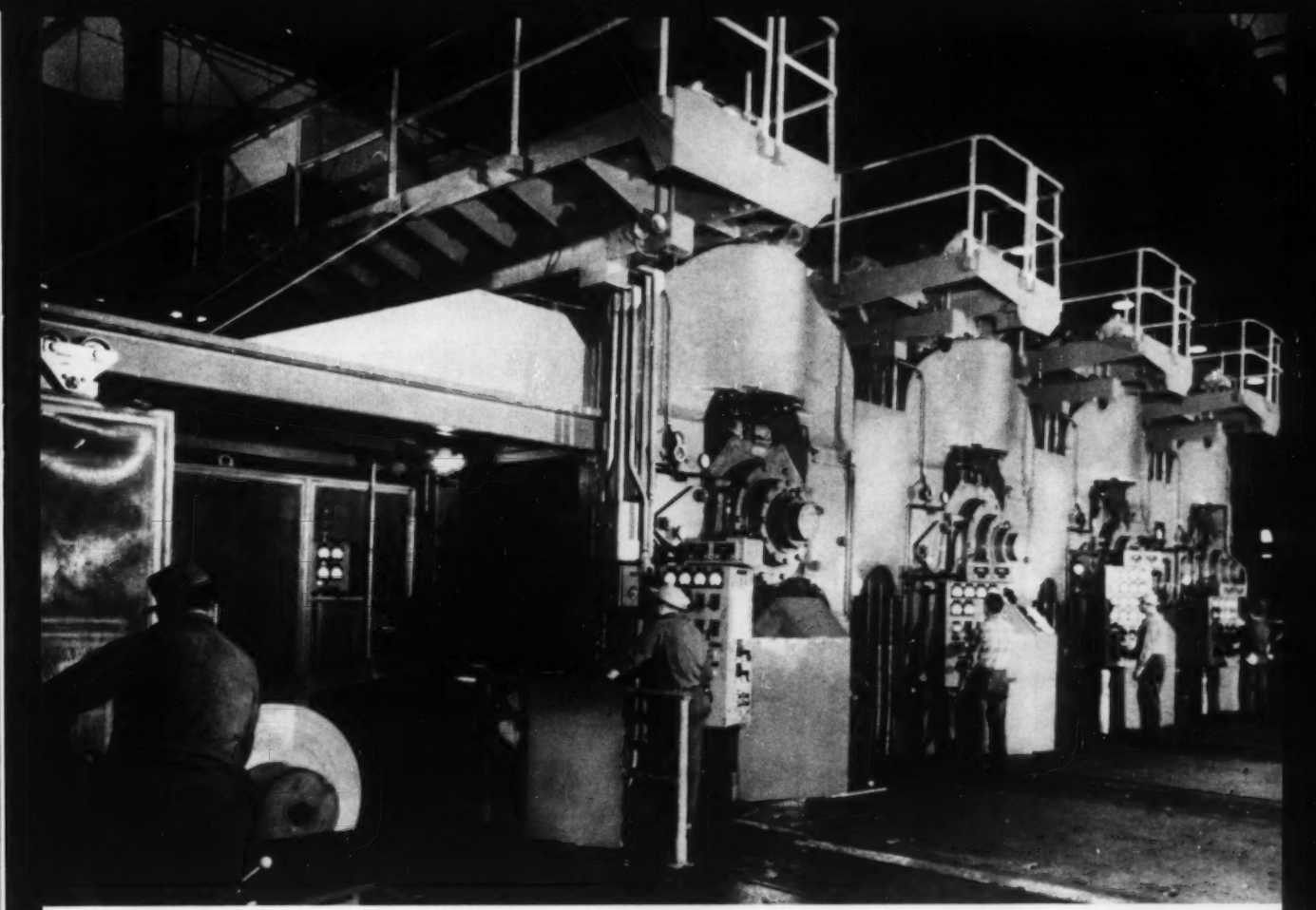


This 66" four-stand tandem cold strip mill at Pittsburgh Steel operates at speeds up to 3190 fpm maximum, has 17,700-hp total drive motor capacity.

Higher speed . . . more on-gauge strip

with Westinghouse Magamp* regulators on coordinated mill drive systems

In March, 1954, the first tandem cold reduction strip mill controlled entirely by Westinghouse Magamp magnetic amplifier regulators was installed at the Pittsburgh Steel Company, Allenport, Pennsylvania. This control's performance since then has resulted in higher permissible operating speeds and more on-gauge strip. Practically no adjustment or maintenance has been required on the mill stand and reel regulating equipment.

Two other four-stand tandem mills with individual generator power supply and all Magamp control are operating successfully, and equipment for four additional mills is being manufactured or installed.

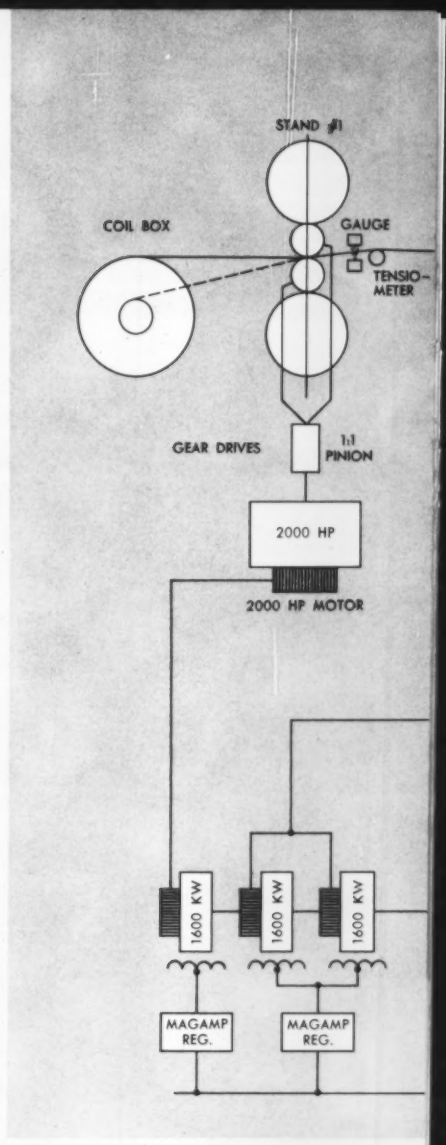
*Trade-Mark

See how Westinghouse coordinated drive systems are Magamp controlled for greater productivity

YOU CAN BE SURE...IF IT'S Westinghouse

Precise Magamp power control yields . . .

More on-gauge strip at 6000 fpm and beyond



More on-gauge strip during acceleration, deceleration and rated speed rolling are yours with Westinghouse Magamp regulators . . . even with the trend toward greater power application. Results are fewer waste ends, increased productivity.

A Magamp regulator system delivers optimum over-all mill performance because it properly regulates and improves the response characteristics of mill and reel motors and power supply generators.

Magamp's high amplification and extremely short response time assure accurate generator voltage control. Operation from 400 cycles gives fast response and inherent stability without complex or critically adjusted damping circuits. Here's how the system works:

DRIVE ARRANGEMENT—Working rolls in mill stands one and two are driven together through pinion stands. Upper and lower rolls in stands three, four and five are driven separately through offsetting speed-up gears, the 6000-hp #5 drive consisting of two 3000-hp, double-armature motors. Winding reel motor is 1500-hp, triple armature. Each stand and reel drive is supplied from separate generators, on two motor-generator sets with duplicate 12,000-hp synchronous driving motors.

MAGAMP REGULATOR CONTROL—Generator(s) for each stand and reel power supply is controlled by a Magamp voltage regulator, operating on 400-cycle, three-phase supply from an alternator set.

AUTOMATIC GAUGE CONTROL—Strip thickness gauge at stand one controls stand one screwdown to minimize variations in starting hot strip and to feed uniform strip to rest of mill. Gauge at stand five controls stand five motor speed, and tension between stands four and five to maintain constant gauge of finished strip.

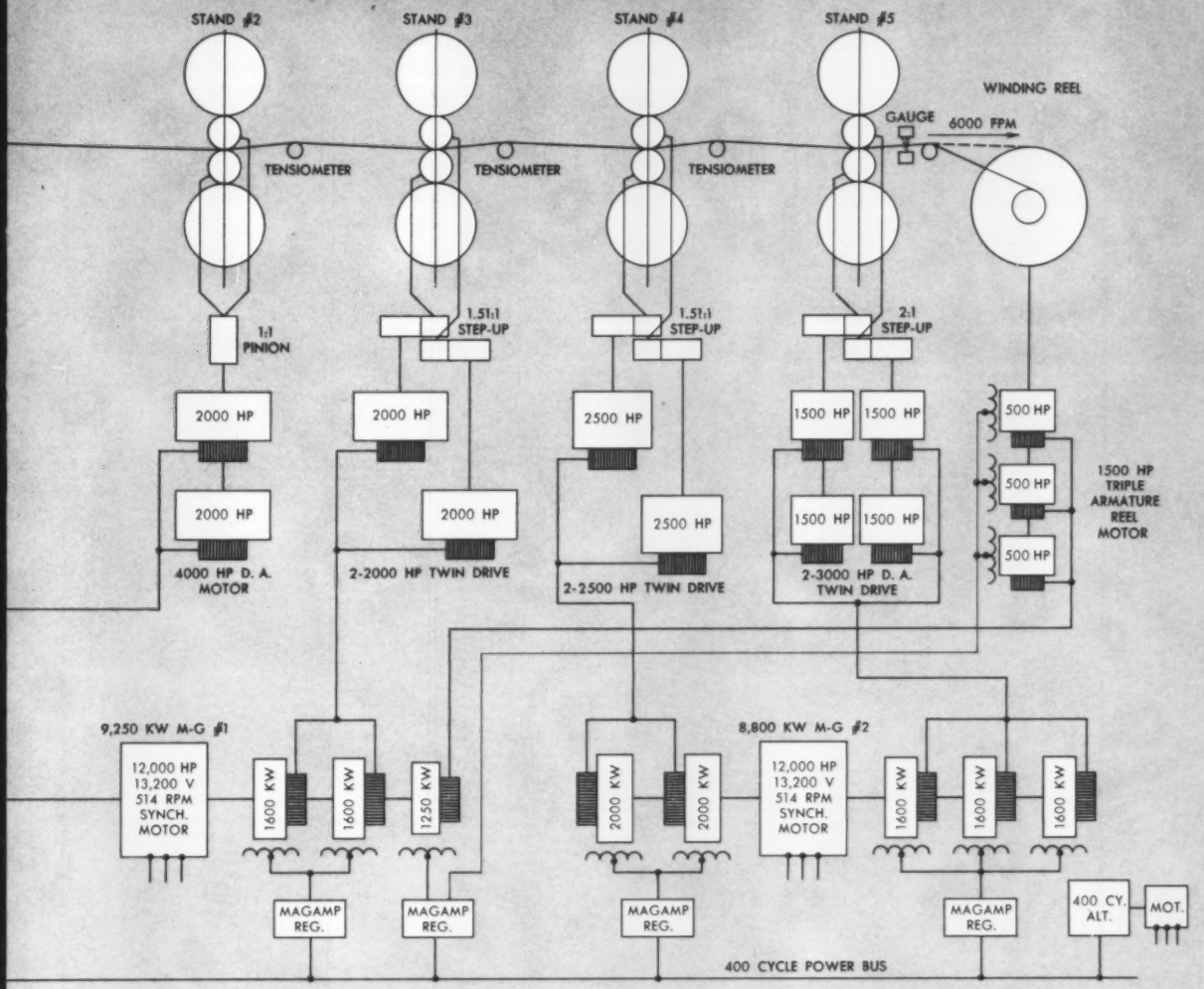
TENSIOMETERS—Units between stands indicate total tension and difference in tension between two edges of the strip.

YOU CAN BE **SURE**...IF IT'S

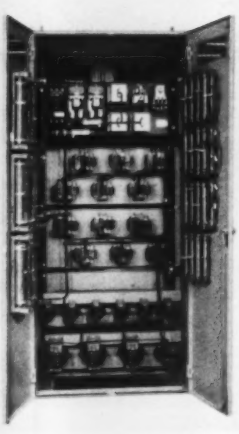
Westinghouse

Motor room for 66" tandem cold strip mill.

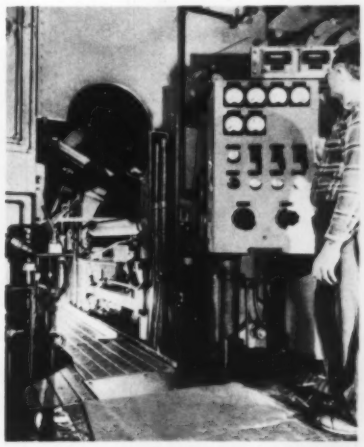
6000 fpm tandem tin plate mill



A 48"-wide five-stand mill like this is now under construction for the Wheeling Steel Corporation. It will have 22,500-hp total drive capacity to produce tin plate and heavier strip at speeds up to 6050 fpm.



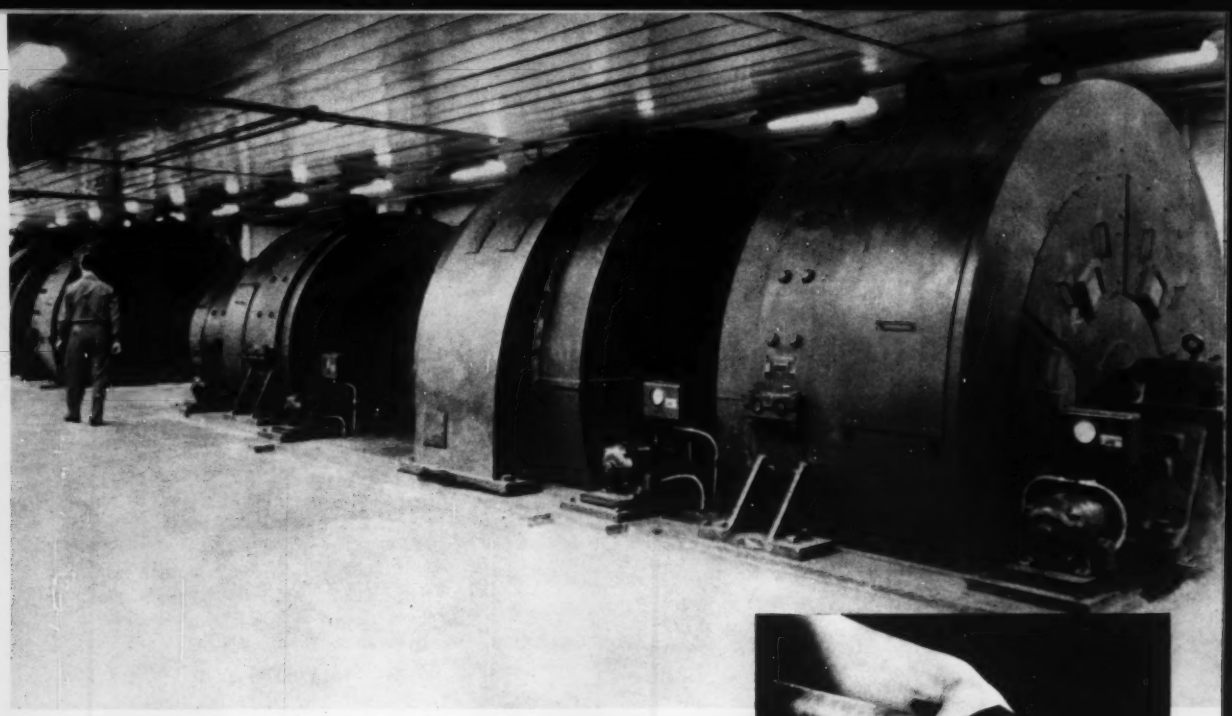
Magamp regulator cabinet.



Tensiometer between mill stands.

Progressive users of Magamp regulator control on tandem cold strip mills

PLANT	YEAR	STANDS AND WIDTH	DELIVERY FPM	TOTAL HP
Pittsburgh Steel Co. Allenport, Pa.	1954	4—66″	1595/3190	17,700
Alan-Wood Steel Co. Conshohocken, Pa.	1954	4—32″	1100/2293	6150
Empire Steel Corp. Mansfield, Ohio	1955	4—52″	747/1868	8100
Usinor Montataire, France	1956	4—66″	1375/3630	19,450
Nonferrous—Ohio	1956	4—32″	850/2075	4400
Steel Mill—Ohio	1957	3—80″	747/1670	13,000
Wheeling Steel Corp. Yorkville, Ohio	1957	5—48″	2750/6050	22,500



Westinghouse Exclusive!

Thermalastic® insulation excels in punishing steel mill duty

Twenty percent greater dielectric strength, ten times greater voltage endurance, 30 times greater tensile strength . . . that's Thermalastic, an amazing insulation available exclusively from Westinghouse.

Thermalastic shrugs off moisture, high voltage and dirt . . . helps Westinghouse motors and motor-generator sets better withstand severe steel mill operating conditions.

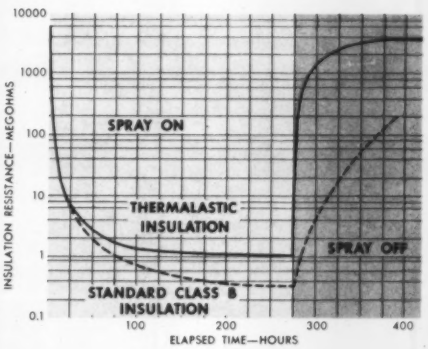
A chemically stable, highly moisture-resistant impregnating resin is used in Thermalastic. This, plus a high degree of fill achieved in the impregnating process, gives Thermalastic extraordinary properties that extend its life in hard service.

Remember, too, Westinghouse switchgear, control centers, ventilation equipment, and gearing are excellent working partners for your Westinghouse coordinated mill drive systems.

From planning to design, installation and start-up . . . Westinghouse is at your service. An experienced Westinghouse team will accept unit responsibility, and work with your engineering staff and consulting engineers in setting up your tandem mill drive.

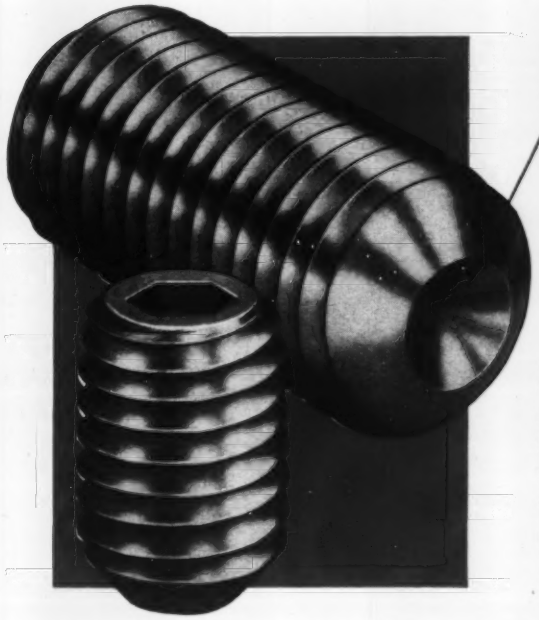
Contact your Westinghouse sales office for further details. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. MP-3046

Thermalastic-insulated Westinghouse motor-generator sets (top photo) for 66" four-stand tandem cold strip mill.



Results of typical laboratory spray test demonstrate superior moisture resistance of Thermalastic compared to regular insulation.

YOU CAN BE SURE...IF IT'S Westinghouse



ALLENPOINT will give you a bulldog grip at no premium in price!

Allen's scientific redesign of the cup diameter on set screws gives greatly increased resistance to *withdrawal* torque. You can count on Allenpoint Set Screws to stay tighter longer, under heavy strain and vibrations. This dependable premium performance of Allenpoints is yours to use without increasing the cost of manufacturing your products.

Uniform Class 3A Threads

Allenpoints' smooth, uniform threads prevent off-lead conditions like Fig. 1. With Allenpoints, you have full, even contact between the engaging flanks of the threaded members (Fig. 2) —and a tight friction lock over the entire length of the Allenpoint Set Screw.

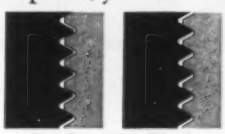


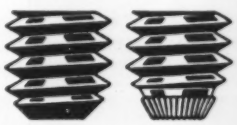
Fig. 1 Fig. 2

Strong, clean, deep sockets allow full wrenching leverage

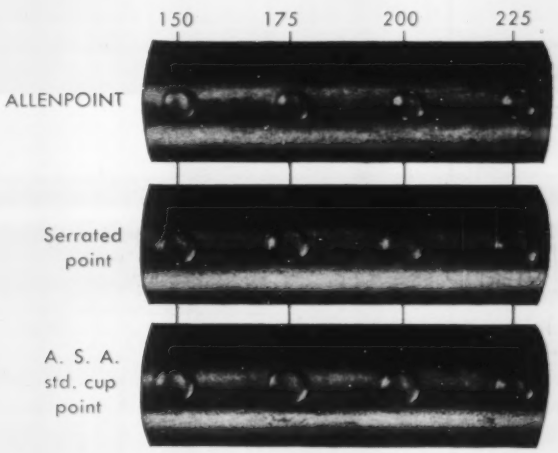
Sockets of Allenpoint Set Screws are cold forged to produce a deeper, smoother socket. No broach chips to interfere with proper seating of the key. This "pressur-forming" preserves the long steel fibers throughout the length of the screw—stronger walls allow maximum tightening torque.

One more full thread on ALLENPOINTS!

Allenpoint Set Screws have one more full thread than serrated point set screws. That means more holding power—especially important when you're using short lengths.



ALLENPOINT's performance compared for you



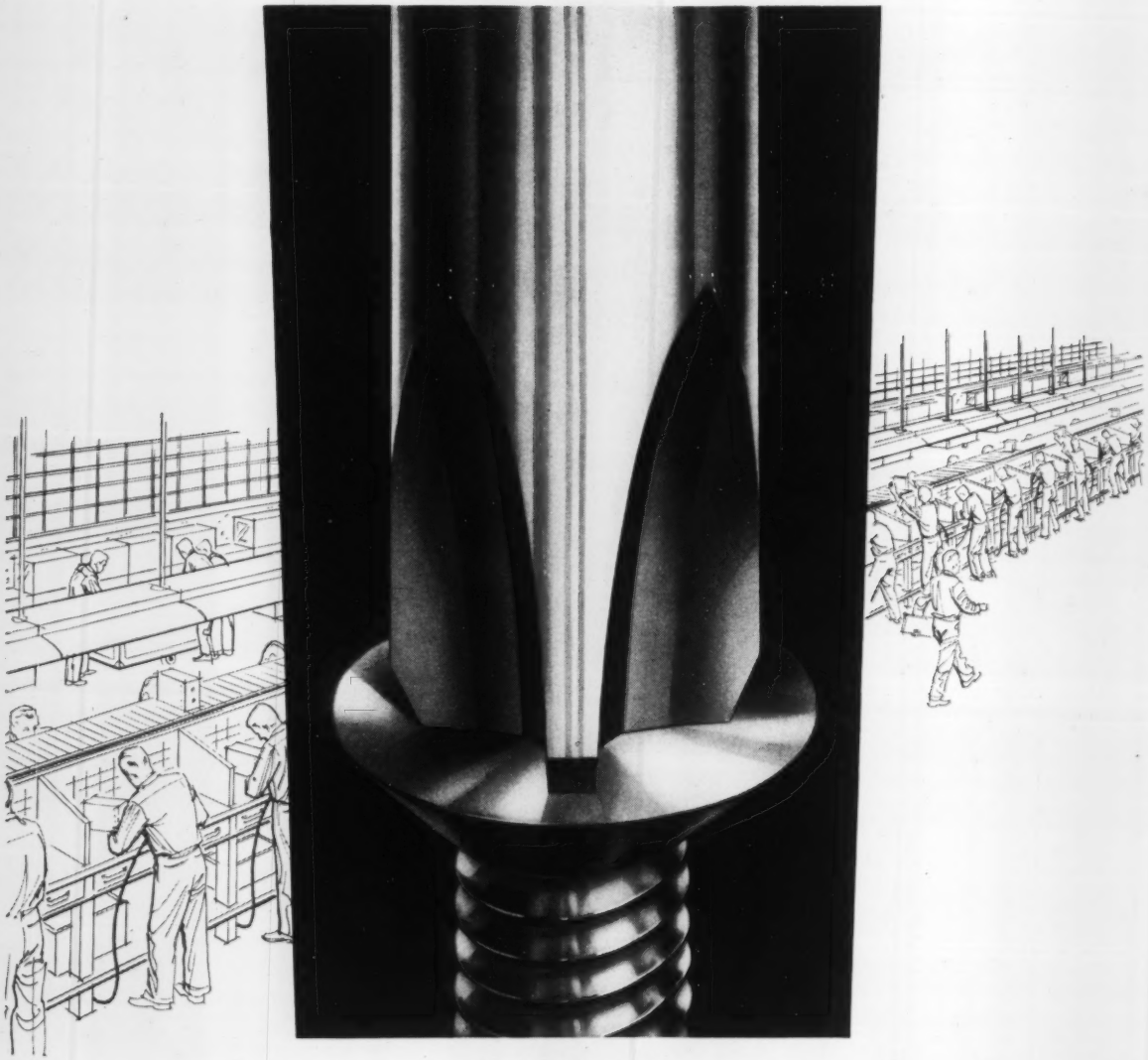
These actual-size, unretouched photographs show the cup pattern made by Allenpoints, serrated points, and A.S.A. standard cup point set screws in a 3/4" steel shaft. At each degree of tightening force, Allenpoints make a full circle pattern, penetrating deeper for greater holding power.

We'll be glad to send you more information and samples of Allenpoint Set Screws and other Allen Socket Screw products.

Stocked and sold by leading industrial distributors everywhere

ALLEN MANUFACTURING COMPANY
Hartford 2, Connecticut, U. S. A.

ALLEN HEX-SOCKET SCREWS HEAD



They may look the same but . . .
AMERICAN is the name!

You can usually break down fastening costs into 4 major factors:

1. Price 2. Service 3. Quality 4. Research

In some instances, local price fluctuations may appear to be worthwhile, but no one gives you more of all four major factors than American.

American Gives You More of All Four

In Service — where air, truck and rail facilities combine with American's precision production controls to meet the most exacting delivery requirements.

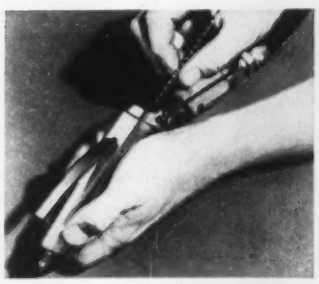
In Quality — where American offers you standards that set a new high for the Industry.

In Research — where American engineers have not only developed the universally accepted Phillips Head Fastener but have produced such exclusive products as SCREWSTICK for industries with unique fastening problems. SCREWSTICK replaces the tedious handling of individual screws with automatic power driving, resulting in cost savings, exceeding 4 to 1.

You can use these same American facilities to increase production, advance quality and lower costs, because no one gives you more of all four factors: *price*, *service*, *quality* and *research*, than American.

Make your own comparisons. Send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!



SCREWSTICK being loaded into air-powered driver

AMERICAN SCREW COMPANY
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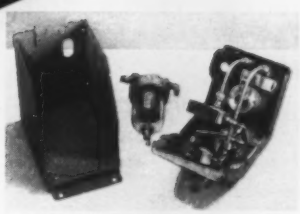
An Even Better DIMENSIONAIR

WITH THE SAME BASIC, *NO-DRIFT* SYSTEM

ONLY AIR GAGE WITH BUILT-IN ACCURACY THAT ENABLES USE OF ONE MASTER

BETTER FILTER with TRANSPARENT BOWL

New sintered bronze element filters out dirt and coagulated oil. Condition of air lines can be readily checked by observing filter bowl. Attached directly to gage, it eliminates extra piping.



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One-piece top and front easily removed with all components and connections attached. Quick, easy servicing, if necessary.

The Dimensionair system is basically sound in principle. Its accuracy is proved constant and dependable every day in practice.

Now, new important refinements have been built into the Dimensionair which further improve its use.

Most air lines installed in plants were NEVER INTENDED to be used for precision instruments of any kind. Hence, the Dimensionair is now made EVEN MORE IMMUNE to unclean air and variations in air pressures.

Adjustments are more foolproof.

Smaller size makes the gage EASIER TO HANDLE and increases its adaptability for general use . . . and for multiple use.

Since any instrument is subject to all degrees of treatment it must be EASY TO SERVICE when the unusual or unexpected upsets its normal function. In the new and smaller Dimensionair all components and connections are quickly and easily accessible.

In every way the Dimensionair provides you with constant accuracy and GREATER DEPENDABILITY, adaptability and service. That's why more and more inspection people buy it. Why don't YOU try it? Write or call us or our nearest office.

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Impartial Gage Selection
Engineering Follow-Through
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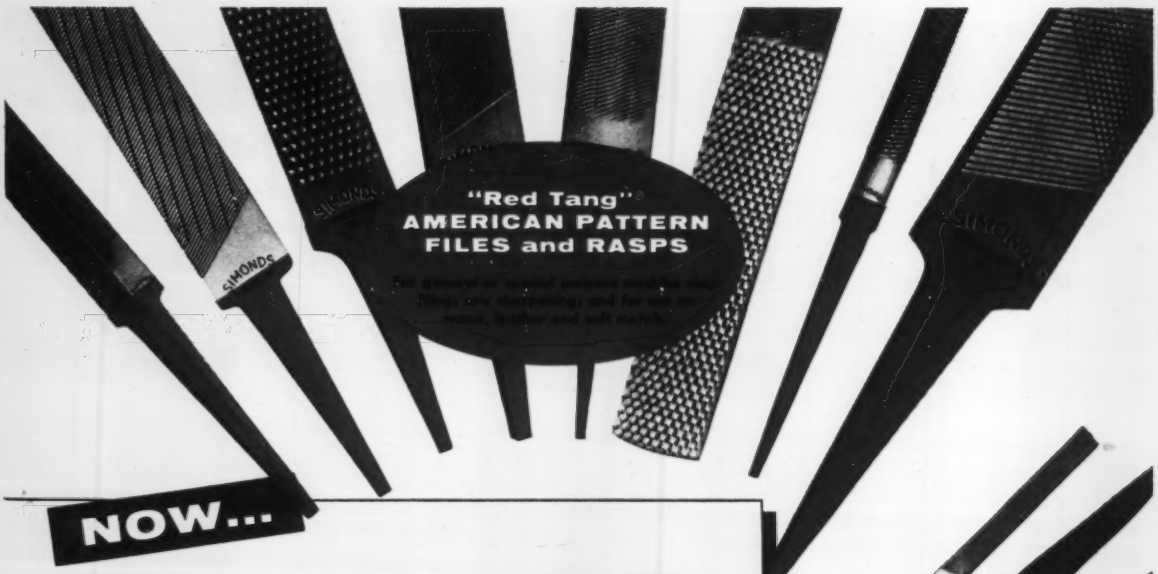
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SIMONDS

has a Complete Line of "Red Tang" Files!

Simonds now offers you all types of files in the Right Length, the Right Shape and the Right Cut for every filing job. What's more, Simonds Files are Grade A. First Quality only . . . backed by Simonds reputation for outstanding quality, dependability and service.

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Canadian Factory in Montreal, Que.
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Heller Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

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Call your
SIMONDS Industrial Supply DISTRIBUTOR

The ONLY Turret Lathe with a fully automatic thread-chasing cycle!

Here is full turret lathe versatility and a threading attachment with a fully automatic cycle — all in one machine. Now you can be sure of concentricity of threading with other lathe work, *all done in one chucking*, with the time saving of the Auto-Threader! Nowhere else in the world can this be found on a turret lathe.

This Auto-Threader will chase straight or taper threads — or a combination — internal or external, from the front of the machine.

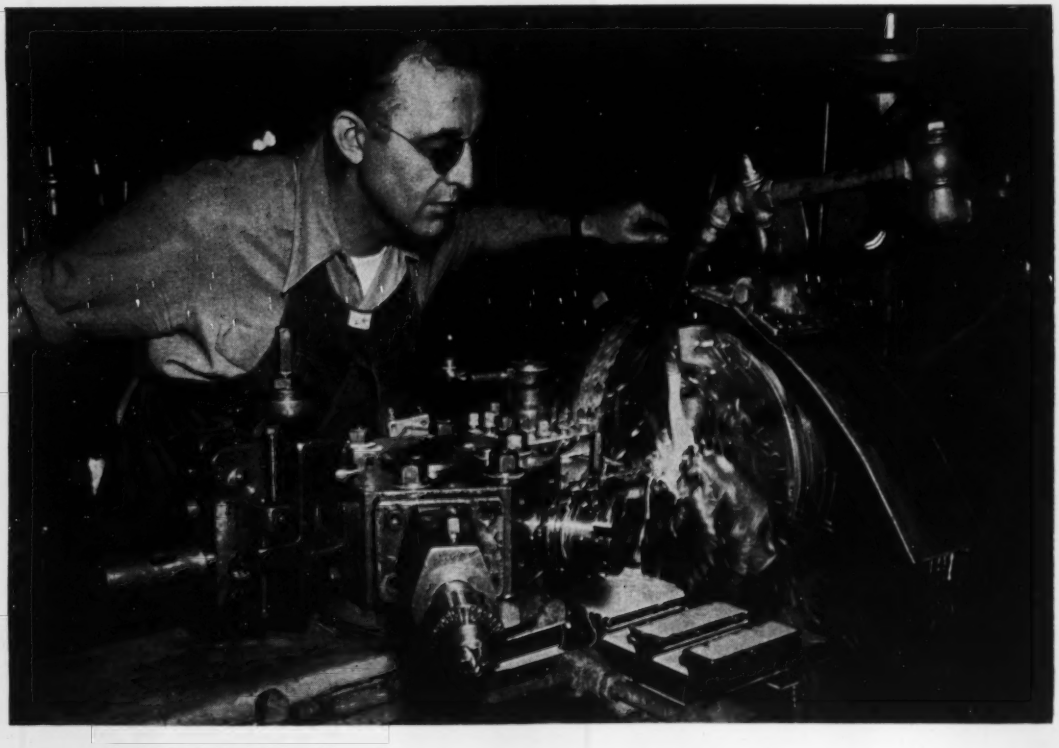
Concerning this J&L development, a customer writes: "We are tripling production on many of our items."

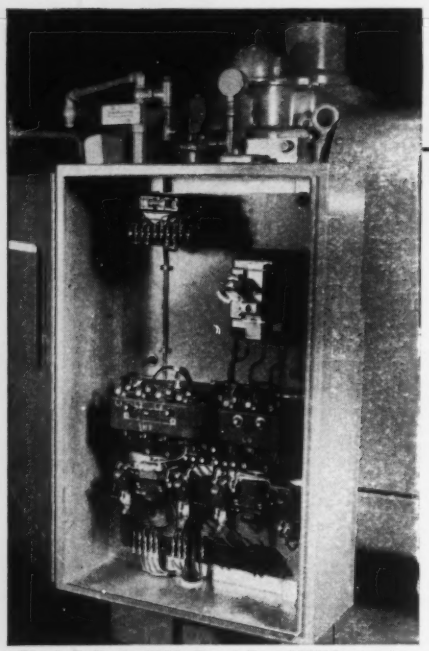
Write for descriptive folder No. 5440. JONES & LAMSON MACHINE COMPANY, 517 Clinton Street, Springfield, Vermont.

JONES & LAMSON TURRET LATHES

the man who needs a new machine tool is already paying for it

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools • Thread & Form Grinders





Clark Bulletin 6050, Size 2 Type "CY" Starter for Single Winding 2 Speed Constant Torque A.C. Motor used on Warner & Swasey Universal Turret Lathes.

CLARK CONTROLS help Warner & Swasey lathes

"machine better, faster, for less"

● Selected for long, trouble-free performance, Clark Bulletin 6050 Size 2, Type "CY" 2-speed starters are used on Warner & Swasey's No. 5 Universal Turret Lathes. Maintenance and wear on contact tips are reduced to a minimum as a result of an exclusive arc quenching method employed on Type "CY" starters. Effective arc interruption and reduced wear on tips is accomplished by using strong multi-turn magnetic blowouts and double-break contacts. Forced rotation continuously moves the arc from a hot to a cold spot, distributing the heat evenly over entire contact, preventing pitting or "build-up." Tips require no cleaning or dressing over long years of maintenance-free operation.

Write for complete descriptive literature.

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Everything Under Control

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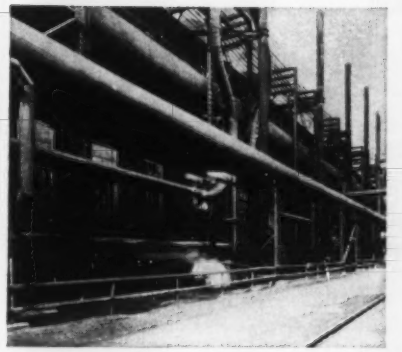
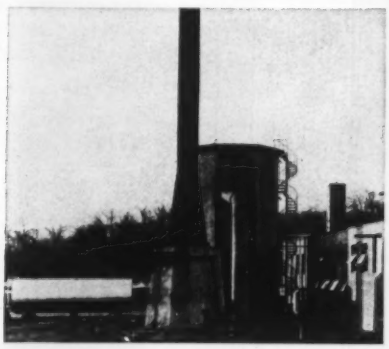
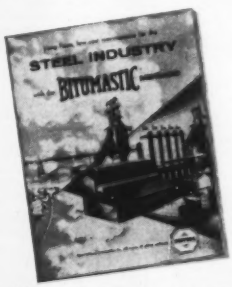


Steel Plant outside piping, structural work and building siding is protected against corrosive attack with Bituplastic® No. 28. This coal-tar base coating was especially developed to give long-lasting, durable protection to metal and concrete surfaces exposed to weathering and sunlight. Ductile and resistant to "alligatoring," Bituplastic No. 28 gives a film thickness, in one application, of from 3 to 5 times that of conventional paints.



High Temperature Stack is protected against corrosion by a coating of Bitumastic® Hi-Heat Gray, a zinc-base coating designed for high-temperature protection. Intermittent temperatures up to 1000° F. and continuous 800° F. dry heat will not affect this coating material, and it is widely used for protection of boiler breeching, stacks and other hot metal surfaces.



Metalworking Maintenance Men will find this new booklet from Koppers a useful reference in planning corrosion-preventive practices. It outlines the usual recommendations for various surfaces and application techniques to insure long-term protection of plant structures and equipment. Write for your copy: Koppers Company, Inc., Tar Products Division, Dept. 101C, Pittsburgh 19, Pa.

how to
CUT CORROSION LOSSES
a report by Koppers Company, Inc.

James Beaumont
Project Leader

How thick should a protective coating on above ground installations be? This is a question that is asked of our Technical Department quite often.

* * *

All other factors being equal, the thicker the protective coating, the longer its service life. Basically, the coating thickness required is dictated by the degree of protection desired and the conditions under which the coating system must perform. Specifically, you need to know the following things about each job: (1) What is the corrosive environment . . . mild? . . . severe? . . . acid? . . . saline? (2) How long must the coating last? . . . is it practical to re-coat every year or are thicker, longer-lasting coatings desirable? (3) The roughness of the surface: since valley-to-peak distance may be as great as 8 to 10 mils, it is vital that peaks be fully covered to the specified thickness. (4) Finally, you should figure the cost of "down time" in terms of lost production.

Another factor in determining coating thickness is the accessibility of the structure. Our pre-coating surveys always include a careful analysis of inaccessible areas where a thicker coating is recommended simply to eliminate for as long as possible the need to re-coat the hard-to-get-at places. This reduces yearly costs by lessening chances of corrosion in places that are passed-by in routine inspections or that are inaccessible.

* * *

The "Steel Structures Painting Manual" (Vol. 1) points out that average industrial conditions warrant a 5-mil coating and severe corrosive conditions need a coating that *must* exceed 10 mils. Generally, our applications research corroborates these recommendations.

It should be remembered that the inherent characteristics of coating materials determine the maximum thickness to which they may be applied in a single coat. For example, some cold-applied coatings of coal-tar base give, in a single coat, a film up to eight times the thickness of ordinary paints. Coal-tar enamels, widely used for pipeline applications, can be applied much more heavily, normal thickness being between 60 and 100 mils. Of course these heavier single-coat thicknesses mean reduced application time and labor costs as well as longer life.

* * *

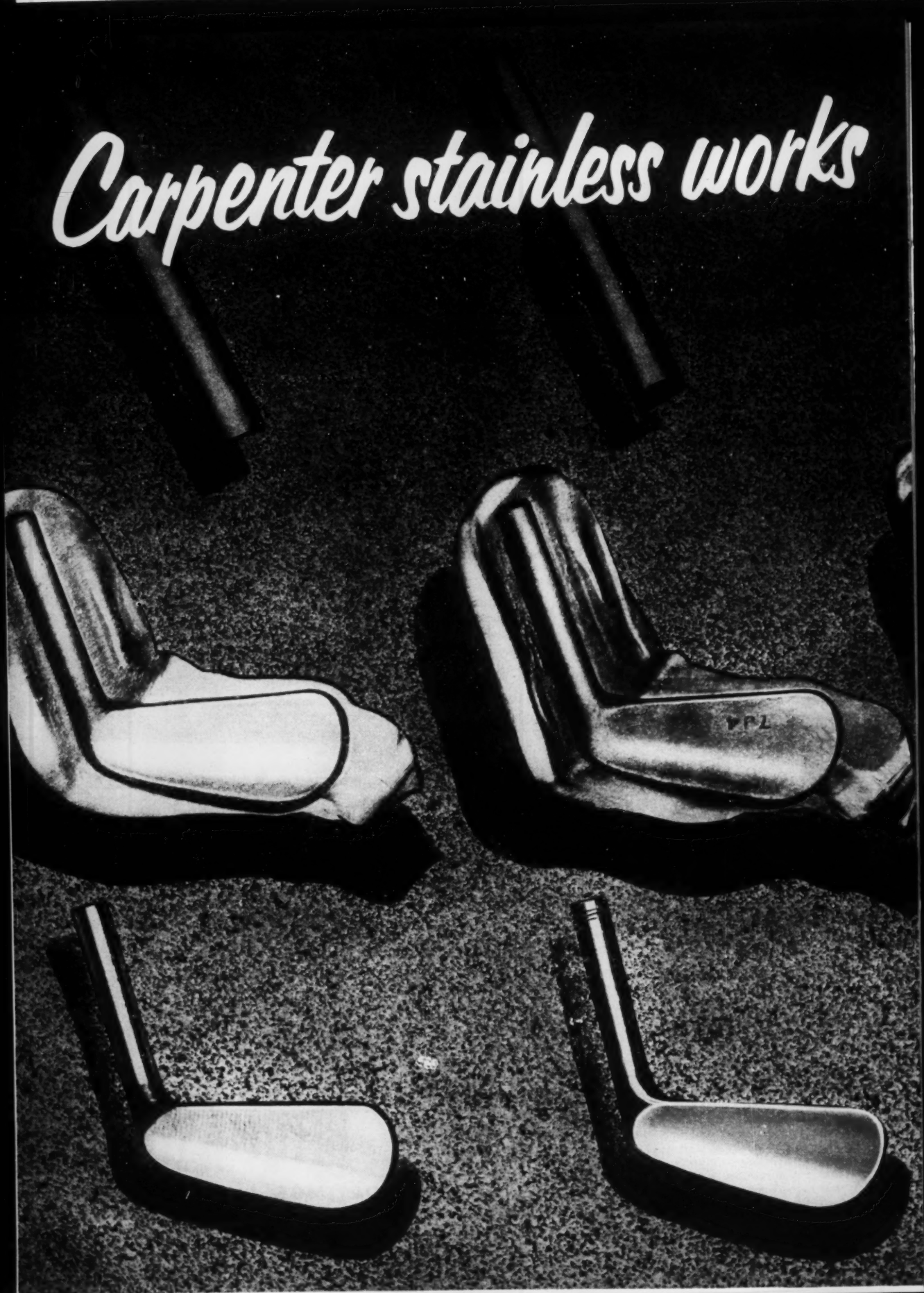
Every attempt should be made to "police" the application to make sure that the desired thickness is obtained. Checks on wet or dry film thickness can be made with mechanical, electrical or magnetic gauges designed for the purpose.

* * *

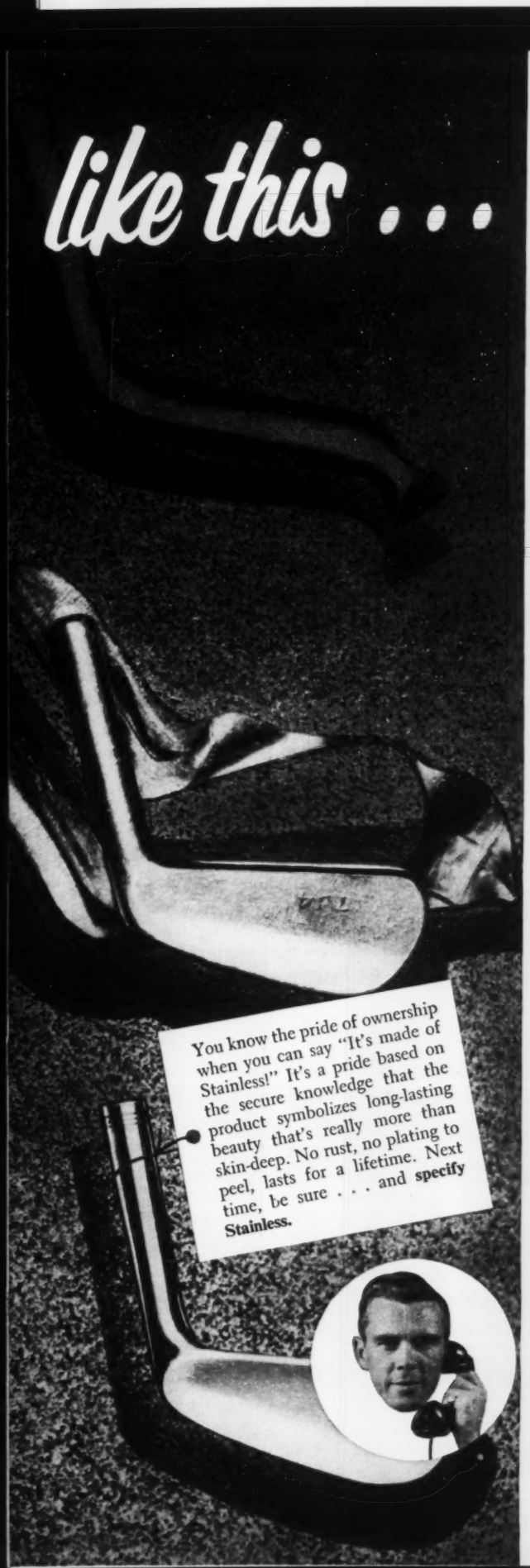
If you have specific problems on protective coating thickness . . . or any corrosion-control problems . . . we'd be glad to hear from you. Write to Koppers Company, Inc., Dept. 101C, 1301 Koppers Building, Pittsburgh, Pa. District Offices: Boston, Chicago, Los Angeles, New York, Pittsburgh and Woodward, Ala. In Canada: Koppers Products, Ltd., Toronto, Ontario and Edmonton, Alberta.

KOPPERS

BITUMASTIC
REG. U. S. PAT. OFF.
COATINGS AND ENAMELS


Carpenter stainless works

like this . . .


You know the pride of ownership when you can say "It's made of Stainless!" It's a pride based on the secure knowledge that the product symbolizes long-lasting beauty that's really more than skin-deep. No rust, no plating to peel, lasts for a lifetime. Next time, be sure . . . and **specify Stainless.**

because of *consistent* uniformity bar after bar

when you want *RESULTS* . . .

in definitely improving fabrication of stainless steel, call Carpenter. For example, some time ago a large manufacturer of golf clubs asked Carpenter's help in changing to stainless for golf club heads. Some of the big problems involved were the many unfamiliar stainless fabricating operations (such as cold trimming, broaching, drilling, tapping, stamping, etc.). These operations made a uniformly *free-machinable* grade highly necessary. A Carpenter Free-Machining Stainless of "forging quality" proved its ability to take the severe forging operations involved, with no change in previous fabricating techniques. Through the years, this Carpenter grade has helped the company build product acceptance and user satisfaction.

when you want *ACTION* . . .

on your free-machining stainless needs, dial your nearest Carpenter Mill-Branch Warehouse, Office or Distributor. Immediate delivery from large local stocks is more than a claim . . . it's a *fact* . . . with Carpenter. Turn valuable plant space you've been using for in-plant steel inventory into profitable production space. Let your Carpenter Warehouse save you the cost and trouble of maintaining large stocks of specialty steels. Whether you want a few pounds or a few tons, Carpenter can get it to your plant faster. Dial the Carpenter location nearest you for service the way you want it.

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Free-Machining Stainless Steels

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Export Dept.: The Carpenter Steel Co., Port Washington, N. Y. — "CARSTEELCO"

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CARBORUNDUM® INTRODUCES:

Maximum Automation Potential

newest concept in Abrasive Technology

predicts metal removal savings with abrasive belts before capital investment

M-A-P is a *new* industrial forecast method. It is designed for automation-minded manufacturers whose production operations include heavy stock removal, finishing or semi-finishing of component parts. M-A-P predicts operating-cost savings and production increases resulting from the engineered application of the correct machine and abrasive belts—in advance of any investment in material or equipment.

M-A-P is actually the application of science to metal removal—economic science and abrasive science combined to take the guesswork out of grinding. M-A-P formulas were developed by The Carborundum Company's Coated Abrasive Engineers from a study of all standards and factors entering into abrasive belt grinding operations. M-A-P is based on the accumulated knowledge of Carborundum's years of coated abrasive manufacturing experience and the abrasive machinery know-how of its Curtis Machine Division.

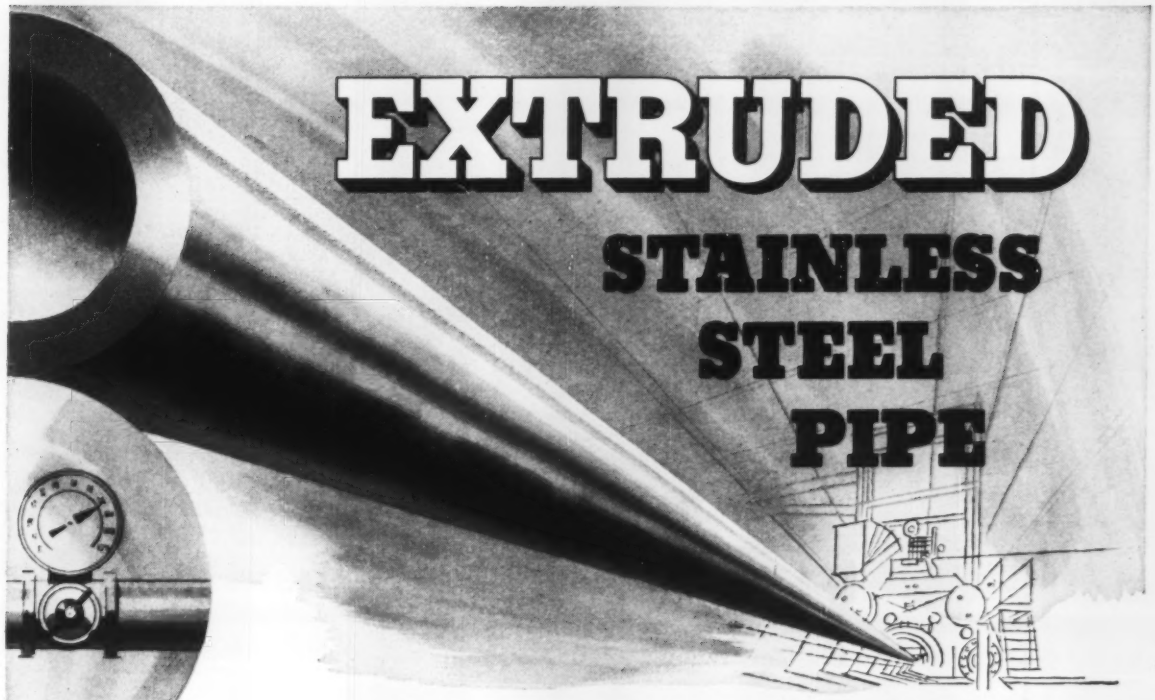
Maximum Automation Potential predictions are now available to you as a standard engineering service of The Carborundum Company's Coated Abrasives Division. To get an M-A-P study on one of your present or planned metal removal operations, you need only supply a few basic production facts. Carborundum engineers do the rest—M-A-P formulas are applied specifically to your operation—*an M-A-P Recommendation is then mailed back to you.* Now, with M-A-P you can *predict and compare* return on investment—without obligation.

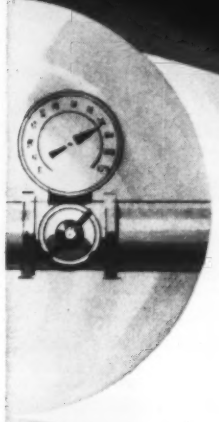
For further information, write to The Carborundum Company, Dept. 32, M-A-P, Senior Coated Abrasives Engineer. Ask for the M-A-P Brochure which explains this new engineering service to industry in detail.

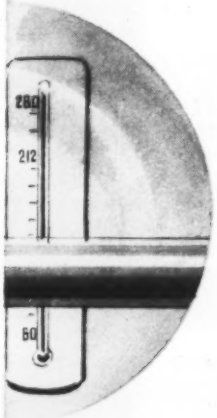
The **CARBORUNDUM** *Company*

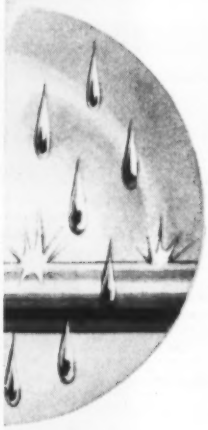
COATED ABRASIVES DIVISION

Niagara Falls, New York









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- Type 310 and 316 alloys
- 10 to 20 inch diameters
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- Schedule 40 and heavier wall thicknesses

High Integrity Pipe, for the toughest applications of the power, petroleum, chemical, and other industries, is now being *extruded* at the Metals Processing Division of Curtiss-Wright. In the Division's giant 12,000-ton horizontal steel extrusion press, the inherent properties of stainless steel alloys are transformed into pipe to your specification under tremendous one-push pressures. The result is uniformly high strength . . . high resistance to pressure, heat and corrosion. Investigate the superiority of this new pipe for your application.

Tooling is in stock for prompt action on standard requirements as listed above. Inquiries are invited regarding special orders for diameters smaller than 10 inches and for alloys other than the standard 310 and 316.

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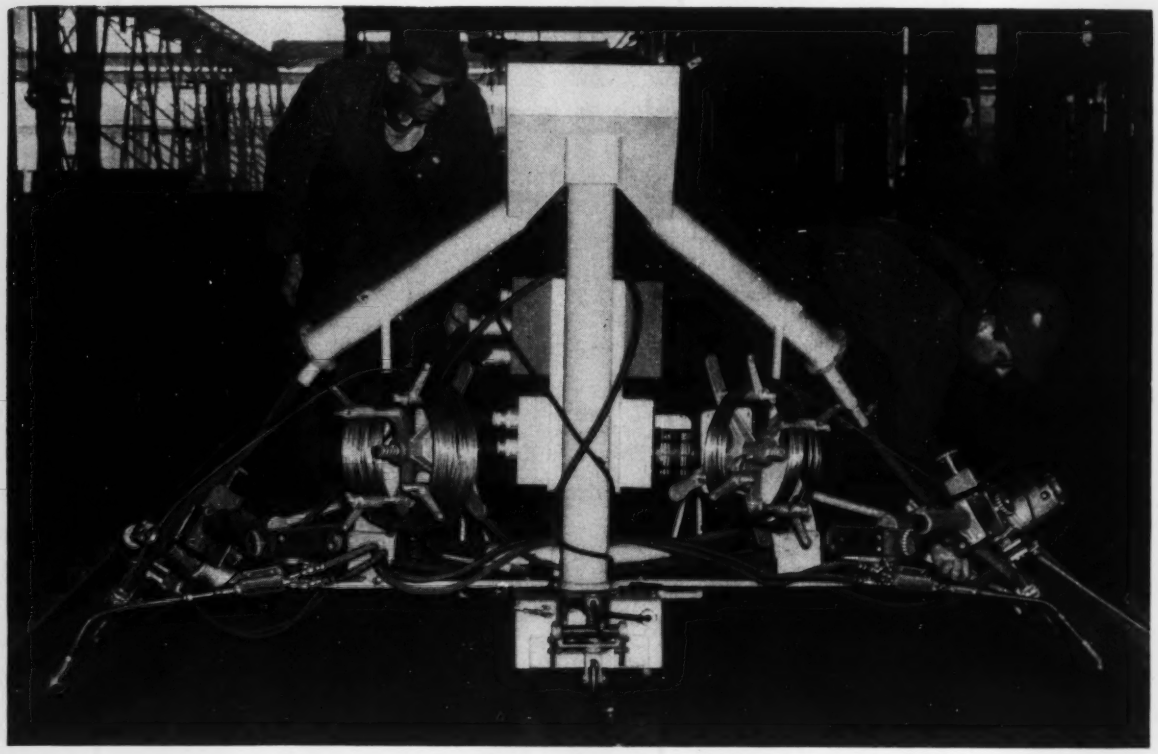

UNIONMELT *welding simplifies and speeds fabrication of giant steel beams.*

two heads are better than one

PARTICULARLY WHEN THEY'RE "UNIONMELT" WELDING HEADS

Mounted on a single LINDE machine carriage with a common composition hopper, dual UNIONMELT welding heads enable fabricators of steel beams to—double production speed, produce premium quality welds, and cut equipment costs.

In this highly efficient installation welding controls are within easy reach of the operator. He can clearly observe welding conditions, and make any amperage or voltage adjustment necessary. Another feature used here is a grooved, magnetic track which provides a sure course for the carriage guide wheel to travel as welding heads move over their work . . . Welding is fast, and operations are simple.

UNIONMELT Welding Features

Extreme depth of penetration—the ability to make welds up to 1½ inches thick in a single pass—plus high welding speeds make UNIONMELT welding the most economical process for a wide range of fabricating and repair jobs. Equipment is available in both portable manual machine, and automatic machine installations.

For complete information on UNIONMELT welding, or for technical assistance in planning your new welding installation, call your local LINDE representative or write for free illustrated literature.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

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You get what you want with

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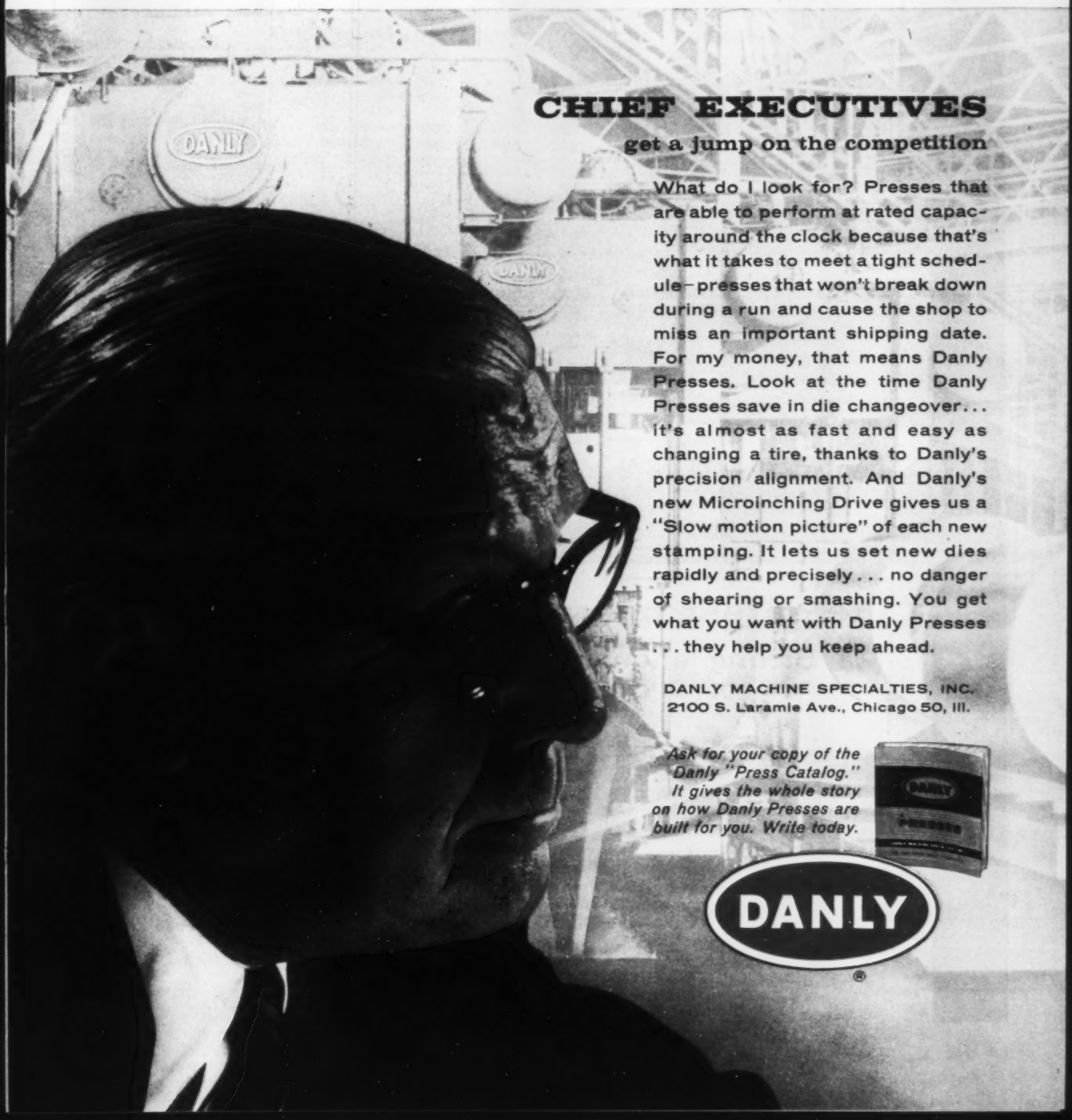
PRESSES



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What do I look for? Presses that are able to perform at rated capacity around the clock because that's what it takes to meet a tight schedule—presses that won't break down during a run and cause the shop to miss an important shipping date. For my money, that means Danly Presses. Look at the time Danly Presses save in die changeover... it's almost as fast and easy as changing a tire, thanks to Danly's precision alignment. And Danly's new Microinching Drive gives us a "Slow motion picture" of each new stamping. It lets us set new dies rapidly and precisely... no danger of shearing or smashing. You get what you want with Danly Presses ... they help you keep ahead.

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Ask for your copy of the Danly "Press Catalog." It gives the whole story on how Danly Presses are built for you. Write today.

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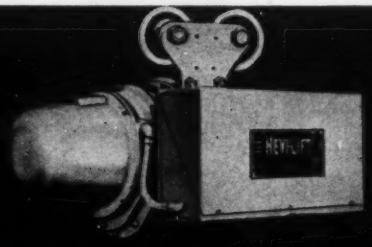
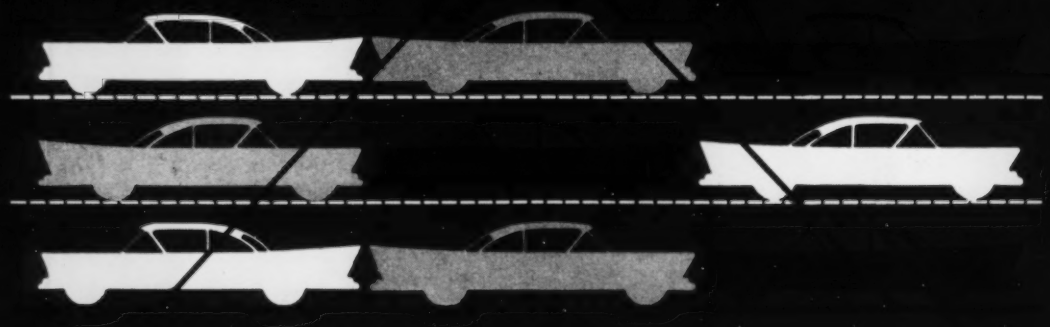


P&H HEVI-LIFT



the safest heavy-duty hoist built

Strong enough to lift the weight of 9 cars...and hold it!

(CAPACITIES 1,000 TO 40,000 LBS.)

You wouldn't try to cut corners on safety. Neither would we — that's why every P&H HEVI-LIFT hoist you buy is built with extra safety features designed to protect your equipment and personnel from mishap.

Every P&H Hevi-Lift has *two* brakes, each fully capable of holding a capacity load. What's more, the new RCD (rectified direct current) brake is the safest, most trouble free hoist brake built. This direct-acting brake has no hinge points . . . no linkage . . . no laminated material . . . and no bushings — assuring substantial savings in maintenance.

Look at the Hevi-Lift before your next hoist purchase. Write for Bulletin H5, "P&H Hevi-Lift Electric Hoists." Address: Dept. 201E, Industrial Division, Harnischfeger Corp., Milwaukee 46, Wisconsin.

HARNISCHFEGER

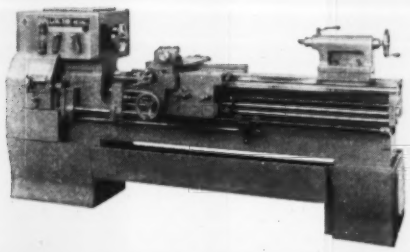
P&H INDUSTRIAL DIVISION

MILWAUKEE 46, WISCONSIN

LeBlond Sliding Bed Gap Lathes

The most versatile lathes in the world

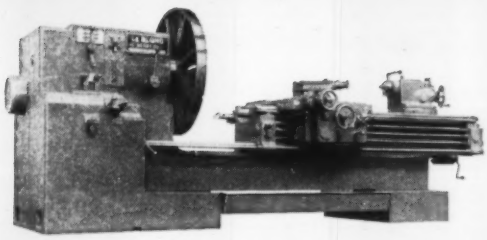
17"/28" *Regal*



For turning a variety of parts—particularly the unpredictable extremes you encounter in maintenance and job shop work, LeBlond Sliding Bed Gap Lathes are unsurpassed. At left is the 17"/28" Regal, smallest of the four LeBlond Sliding Bed Gap Lathes.

Major features, 17"/28" Regal: Hardened and ground replaceable steel bed ways. Combination gear-belt drive headstock. 12 spindle speeds, 48 feeds and threads. Both feed rod and leadscrew. 3 bearing spindle *Write for Bulletin RG-210-A.*

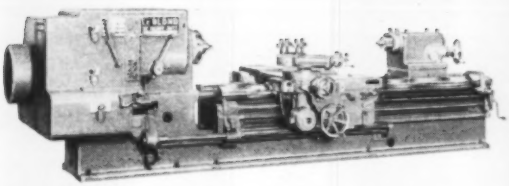
16"/38" *Heavy Duty*



With bed closed, LeBlond Sliding Bed Gap Lathes function as regular engine lathes. The special bed slides open to form a gap that will accept odd-shaped parts and large diameter work. This also provides greater bed length, more than 50% greater distance between centers.

Major features, 16"/38" Heavy Duty: Combination gear-belt drive provides a complete speed range from 16 to 2000 rpm. 4-way power rapid traverse. New spindle mounting for safe high speeds. Hardened and ground bed ways. *Write for Bulletin SBG-104-A.*

25"/50" and 32"/60" *Heavy Duties*



Seventy years of LeBlond experience in solving day-by-day turning problems, extensive laboratory research and practical ideas from our own shop combine to give Sliding Bed Gap Lathes features to meet your turning requirements for years to come.

Major features, 25"/50" and 32"/60" Heavy Duties: 36 speeds at high power. 4-way power rapid traverse. Automatic lubrication in the headstock, quick change box and apron. Hardened and ground bed ways. Anti-friction bearings throughout. *Write for Bulletin SBG-106-G.*

The R. K. LeBlond Machine Tool Company

Cincinnati 8, Ohio

LeBLOND of Cincinnati

World's largest builder of a complete line of lathes for more than 70 years

(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER I—Decorative, Corrosion-Resistant Finishing with Iridite

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a decorative finish or a good paint base for non-ferrous metals. However, continued developments are so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can combine salable appearance with durability in one finish at a competitive price advantage. Report II on paint base, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, as a basis for this discussion, a "decorative" finish is considered as any chromate film that is used as a final finish in itself. It may be truly decorative in that its sole purpose is to enhance the beauty of the product. For example, a bright chrome-like finish or a pleasing bronze appearance are among the many effects that can be obtained. It may be functionally decorative in that it reduces reflectivity for camouflage purposes or provides a means of color-coding parts. But, in all cases, the Iridite films protect the metal against corrosive attack.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. These films can produce a wide variety of pleasing appearances. The basic colors of the Iridite coatings are grouped below by metals.

ZINC and CADMIUM: Metallic bright, light iridescent, iridescent yellow, bronze, olive drab.

COPPER, BRASS, BRONZE: Metallic bright, yellow.

ALUMINUM ALLOYS: Clear, iridescent yellow, brown.

MAGNESIUM ALLOYS: Metallic bright, iridescent yellow-red, brown.

SILVER: Metallic bright.

In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

Depending upon the metal and the Iridite used, corrosion resistance of clear and bright films ranges from mild passivity to as high as 500 hours in salt-spray; on heavier dark films, salt-spray resistance ranges from approximately 100 to 1000 hours.

It is this combination of decorative and corrosion resistant properties that accounts for the widening use of Iridite finishes. For example, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, a combination of lustrous chemical polishing of the as-cast surface of zinc die castings and good resistance to corrosion. Further, in many cases, sizeable savings in the cost of buffing and electroplating are realized.

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

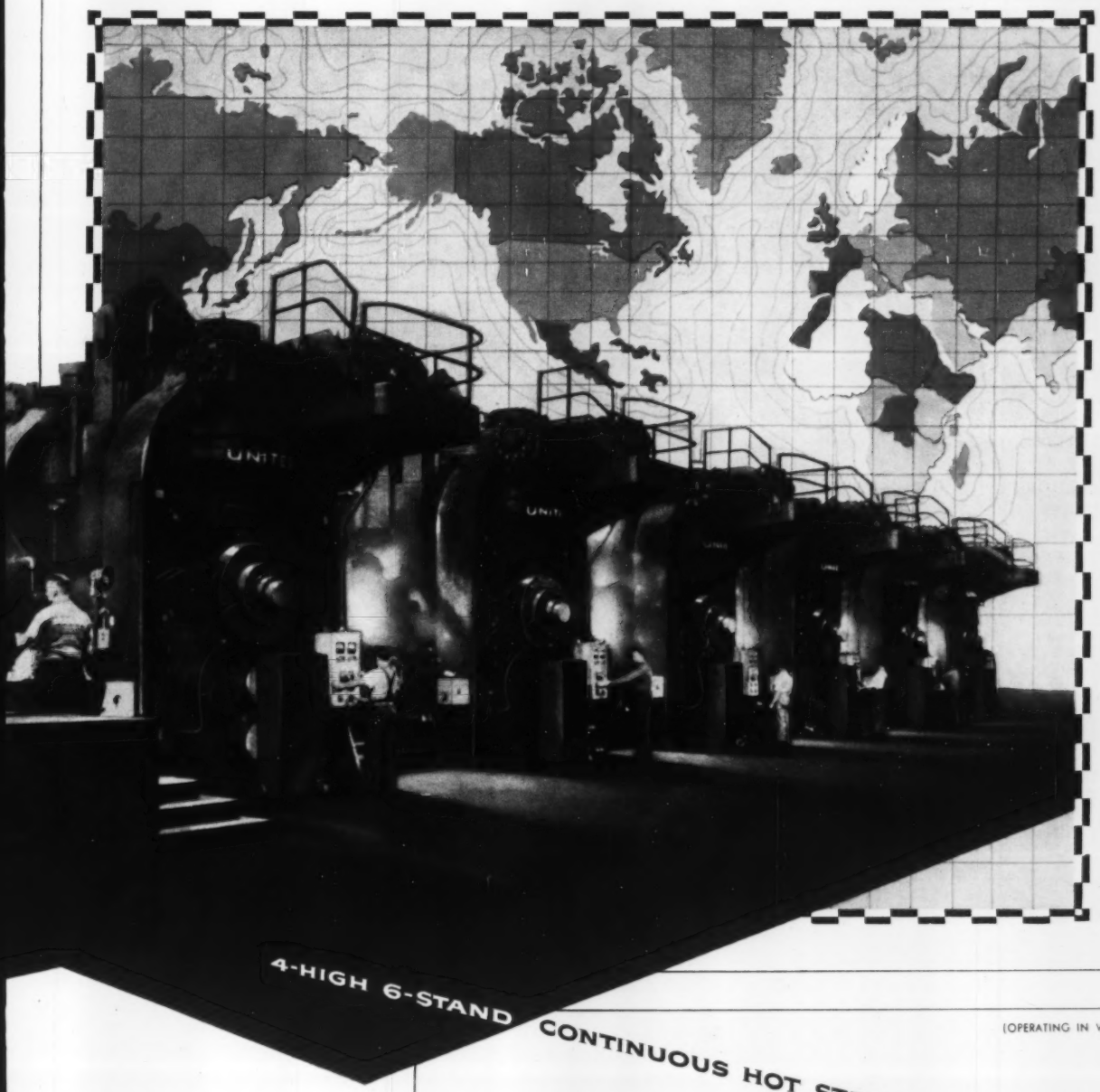
On many steel parts, a simple system of zinc or cadmium plate and bright Iridite is used instead of more costly electroplated finishes to provide a bright, decorative and protective finish with tremendous savings in material, equipment and labor.

In finishing aluminum, where corrosion resistance or paint adherence is the prime consideration, the aircraft industry has all but abandoned the anodizing process in favor of recently developed chromate conversion coatings, among them Iridite #14 and #14-2 (Al-Coat). These formulations and their method of application can be varied to retain the original metallic appearance while providing acceptable corrosion resistance, or to produce a fully colored brown finish that offers exceptional corrosion protection. Again, time and manpower savings are astounding—one company saved at least $15,000 a year on maintenance of racks alone and another $40,000 on materials and labor in only nine months. In addition, of course, hundreds of thousands of dollars are saved by eliminating the need for expenditures for generators, heating equipment and racks.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to having decorative and protective functions, these chromate coatings form an excellent base for organic finishes and bonding compounds. They have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 E. Monument Street, Baltimore 5, Maryland.



4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

(OPERATING IN WALES)

DESIGNED AND BUILT BY

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

UNITED can serve you no matter where in the world you are.

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Designers and builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Process Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

Simple Arithmetic...
Type 302, Sheet Base Price 50.00 cents per lb.
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Now you can SAVE $215 per ton in base price alone!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10¾ cents per pound difference in base price. Some of our customers are already saving more than $215 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

We are currently producing our MicroRold Type 430 sheets up to 48" wide in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

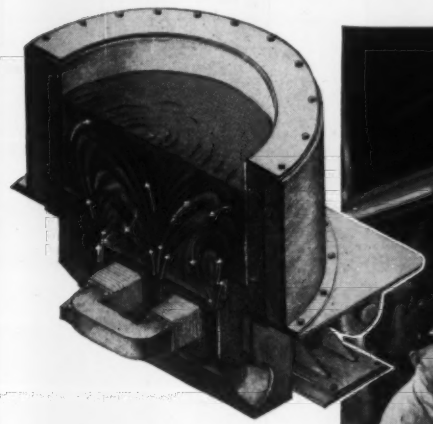
Send for Your copy, "Care and Use of 430 MicroRold Stainless Steel"

Washington Steel *Corporation*

3-0 WOODLAND AVENUE, WASHINGTON, PA.

Hard-To-Melt Bronzes Successfully Handled
in
AJAX INDUCTION FURNACES

Brass and bronze foundries all over the country have found AJAX-TAMA-WYATT induction furnaces a reliable tool for melting silicon bronzes, aluminum bronzes, leaded bronzes, phosphor bronzes, and other high strength alloys. Operation is highly economical due to the good uniformity of the alloys, low ratio of rejects, drastic reduction of metal losses, and clean operating conditions. This recent development opens the field for the use of AJAX induction furnaces in all foundries where difficult-to-melt alloys are handled.



Cross section of AJAX-TAMA-WYATT twin coil induction furnace such as used at the *Torrance Brass Foundry*. Heat is produced within the molten metal in the secondary channels and conveyed throughout the melt by electromagnetic circulation, resulting in minimum metal losses and high uniformity of alloy. Temperature is automatically controlled.

(Photograph courtesy of Long Beach Press-Telegram, Long Beach, Cal.)

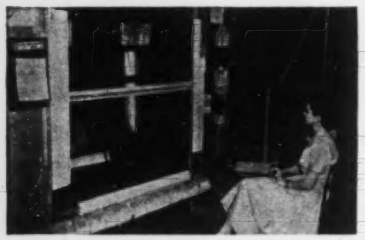
The Furnace pictured above is melting aluminum bronze at the *Torrance Brass Foundry, Torrance, Cal.*, operating at a temperature of 2400 F, for the production of high strength centrifugal castings. This unit is rated 100 kw. Note also the clean, smokeless operation as shown in the unretouched photograph.

AJAX

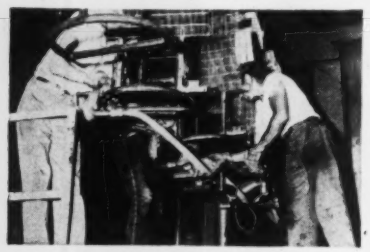
LINE FREQUENCY
INDUCTION MELTING FURNACES
AJAX ENGINEERING CORP.
TRENTON 7, NEW JERSEY

Associated Companies
Ajax Electric Company — Ajax Electrothermic Corp.

JOIN WITH HANDY & HARMAN SILVER BRAZING FOR PERMANENT PROFIT



After brazing, the assembly undergoes the first of four leak tests in a water-filled tank. It is then given a carefully controlled dehydration and vacuum test.



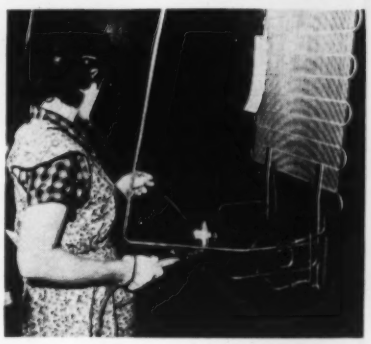
To further insure that the vacuum is maintained, the assemblies enter a helium atmosphere; the smallest leak would draw helium into the system.

Next they are tested by the spectrometer which is calibrated to detect a concentration of helium equivalent to a leak rate of one ounce of refrigerant in 200 years.

How to Join Refrigerator Tubing So It Won't Leak

Hotpoint Company's new refrigerator assembly plant in Chicago boasts one of the most advanced mass-production assembly line operations in the industry. It boasts, also, one of the most stringent quality controls in the industry—with 83 quality checks and tests during manufacturing. Four of these tests are positive checks for hermetic sealing, the most exacting being the mass spectrometer test which can detect a potential leak of one ounce of refrigerant in 200 years.

To a great degree, hermetic sealing depends on the quality of the joints in the tubing connecting the major components of the system . . . Hotpoint's are silver brazed with Handy & Harman's EASY-FLO 45 and HANDY FLUX. Some of these joints are copper-to-copper, others copper-to-steel and the rest steel-to-steel; all are EASY-FLO brazed and have a tensile strength of 30,000 psi.

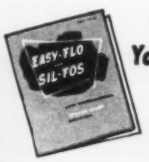


These gruelling production checks are met, basically, with a 3/64" silver alloy wire, double-tipped hand torches fueled by a mixture of natural gas and oxygen, and HANDY FLUX. These are the ingredients of EASY-FLO brazing used by Hotpoint in assembling their refrigeration units. Simple, isn't it? And all the more remarkable in view of the tests the brazed joints must pass.

A joining method this simple, this fast, this economical and this strong warrants your consideration for your product. Ask us for all the facts.

SEND FOR BULLETIN 20

BULLETIN 20 tells you why high strength, speed and economy are inherent in EASY-FLO brazing. Also gives Handy information about joint design and fast brazing methods. We'll be pleased to send you a copy.



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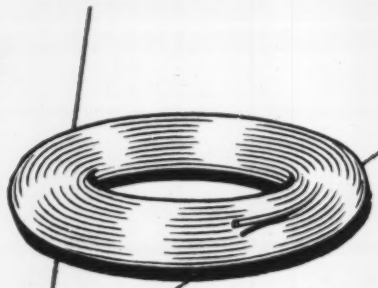

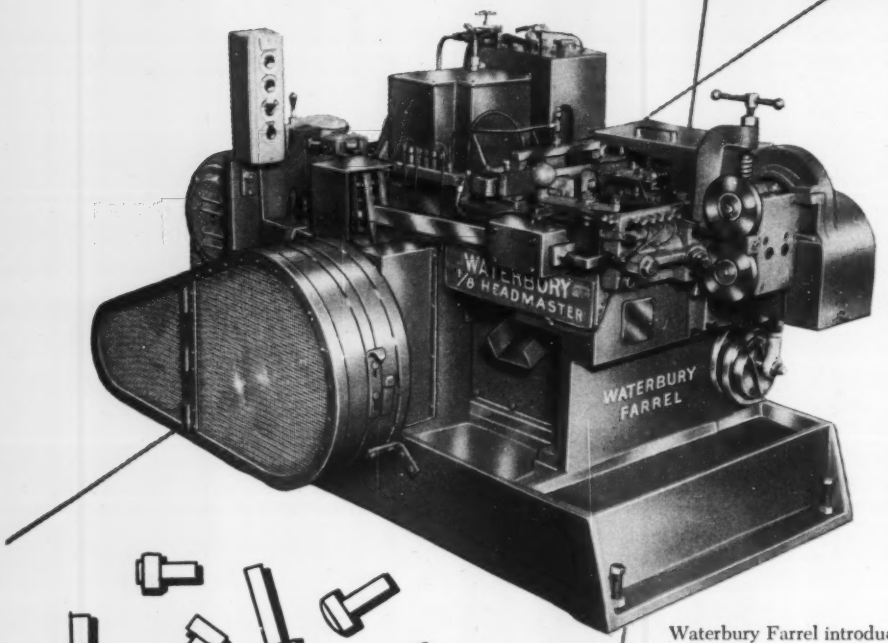

Waterbury Farrel introduces a revolutionary new concept in cold heading speeds... proven by actual production runs to be the world's fastest rates achieved by a solid die double stroke header.

Operating at speeds from 300 to 450 blanks per minute, the machine will head rivets up to ⅛" x ¾, machine screws up to #6 x ¾, and sheet metal screws up to #8 x ¾.

Write today for further information on Waterbury Farrel's "HEADMASTER."

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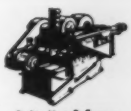
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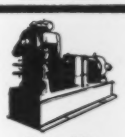
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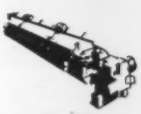
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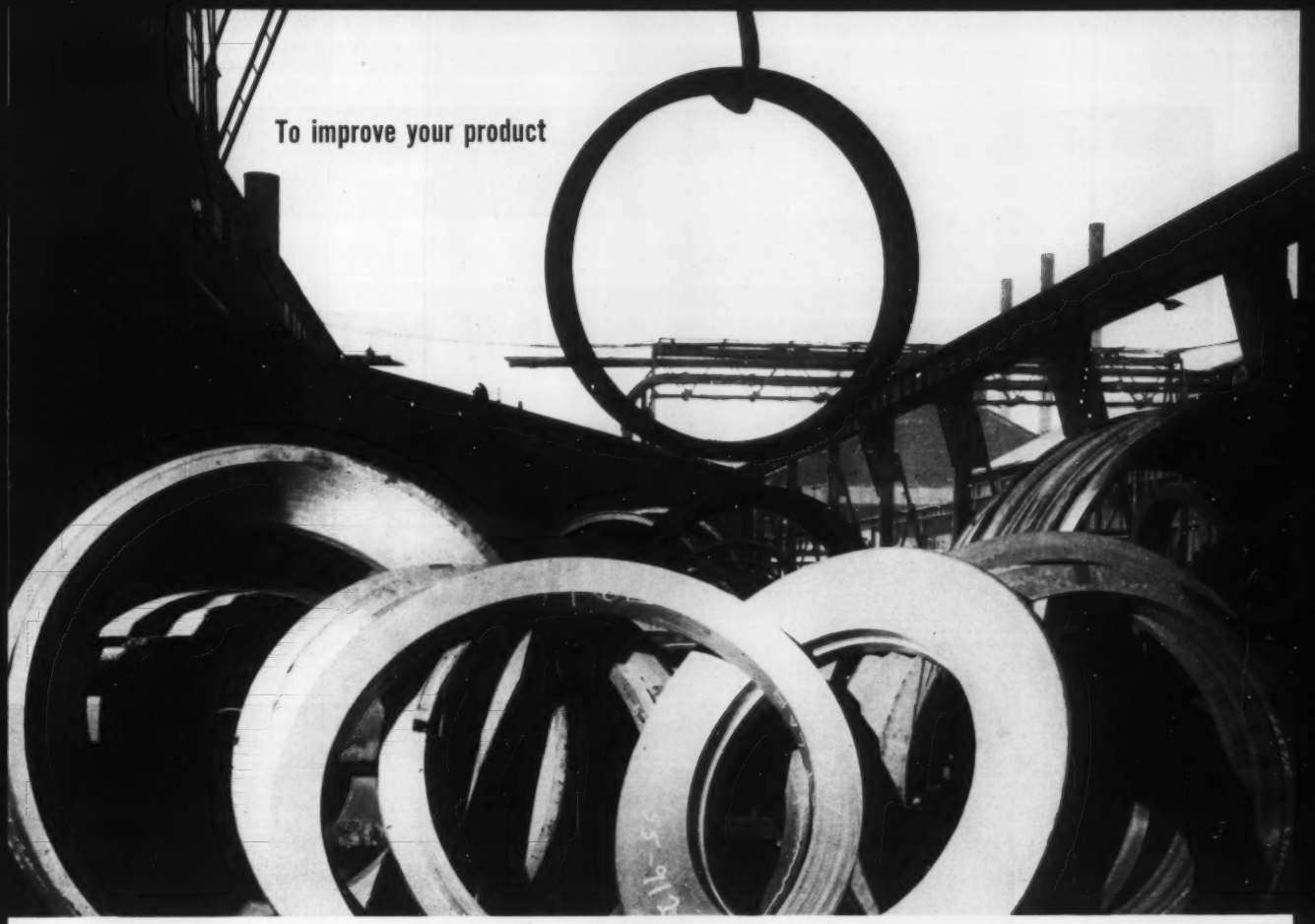
WF-33



ALCO CIRCULAR FORGINGS BRING HIGH QUALITY, UNIFORMITY

Proved steelmaking and forging techniques, new facilities at ALCO build quality and uniformity into circular forgings for savings to you; forged rings also available in new Hi-Qua-Led Steel*

Experience for over 80 years has developed ALCO's steelmaking and forging techniques for the production of high-quality circular forgings. This, coupled with new ALCO facilities such as an automatically controlled preheat furnace, modernized forging press and rolling mills, means unfailing uniformity of any order to your precise specifications – saving you money in machining and extending the service of your product.

For further advantage in machinability, ALCO also offers its circular forgings in Hi-Qua-Led Steel, a significant new development that drastically reduces machining time and tool wear without any change of basic steel properties. Hi-Qua-Led is available in all AISI open-hearth grades.

If your order is Hi-Qua-Led, ALCO metallurgists and machining technicians will be available for your trial machining runs to help you get the full benefits from this new steel.

ALCO circular forgings are available from 18- to 145-in. OD. You can get complete information from the nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-2, P. O. Box 1065, Schenectady 1, N. Y. for brochures.

**Trademark reg. applied for. Patent pending on lead addition method.*

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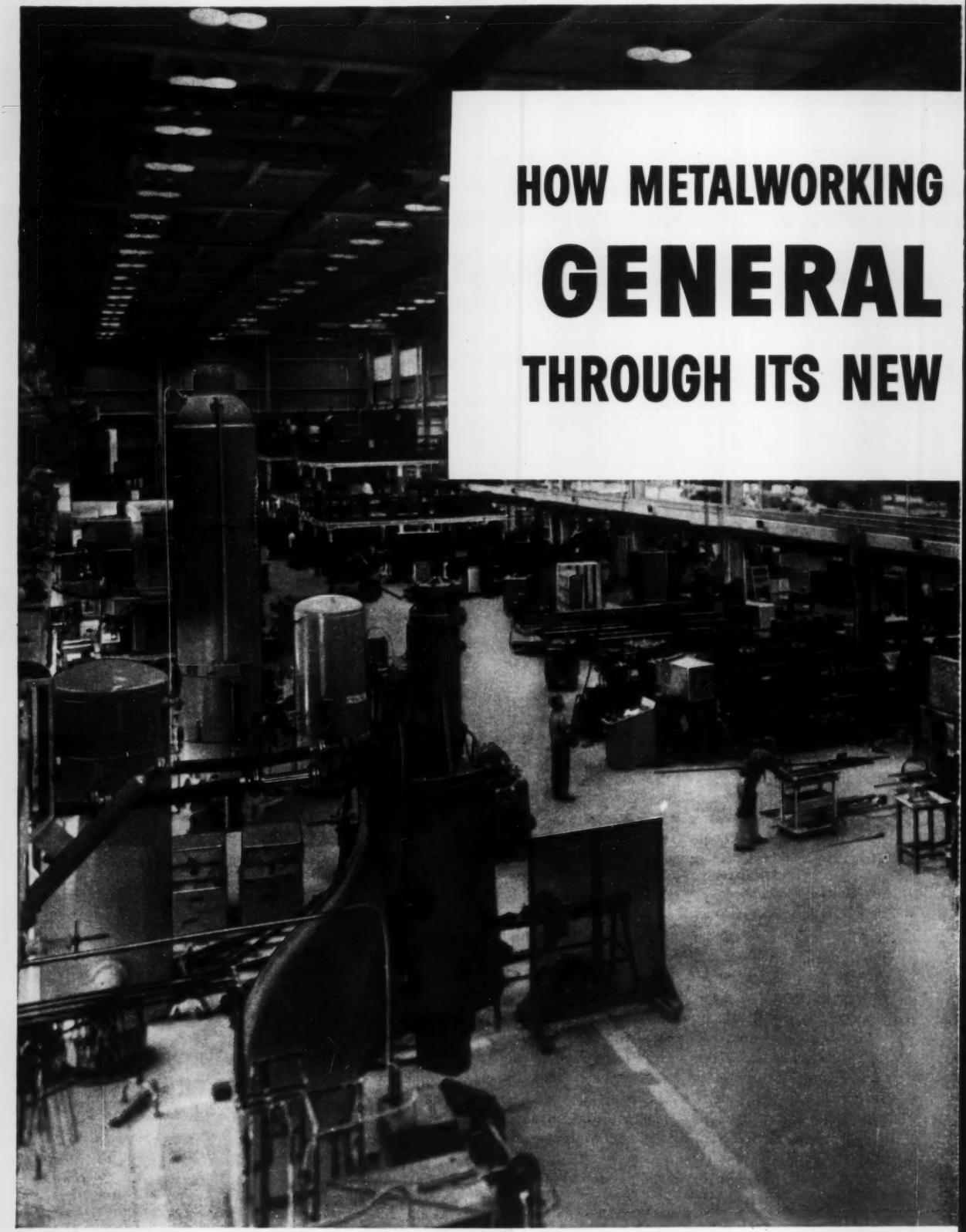


Laboratory with factory-size equipment—that's the new $5,000,000 G-E metals and ceramics laboratory in Schenectady. From here will come many of the products manufactured by the Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Road, Detroit 32, Michigan.

BENEFITS FROM THE RESOURCES OF

ELECTRIC

METALLURGICAL PRODUCTS DEPARTMENT

Solutions to your most pressing problems, plus developments ahead of industry trends, are now being worked out in our laboratories

It doesn't take a crystal ball to know what role cutting tools will play in the Metalworking Industry in the future. The signs are unmistakable.

More accurate casting, extruding, and forging techniques will mean that less metal must be removed by machining. And this will mean that cutting tools must take thinner cuts, and hold closer tolerances.

New and more automatic machine tools will mean that cutting tools must operate at higher speeds – yet provide the longer tool life necessary to give you maximum benefits from automation.

General Electric, through its new Metallurgical Products Department (successor to the Carboloy Department), has already developed several cutting tool materials that are ahead of these trends.

Three years ago, the first of the three Carboloy® Series 300 carbides was announced. Today, these grades permit you to cut harder steels, at higher speeds . . . at lower machining cost per part.

Two years ago, General Electric researchers introduced Cemented Oxide. This material puts mirror finishes on metal, while operating at speeds up to 3000 fpm – far beyond the range of carbides and ceramics.

And last year, G-E Engineers in the Carboloy Machinability Laboratory developed several new machining techniques to help you make better use of these improved materials. One of these techniques lead to a way to utilize carbides at low speeds – starting from 0 fpm – an almost impossible task until now.

All these developments resulted from the vast technological resources which General Electric has brought to bear on metalworking problems – plus the fund of machining knowledge accumulated since G-E first introduced carbides to American industry in 1928.

These resources and this knowledge mean that General Electric–through its Metallurgical Products Department–will be able to recognize and solve new problems of the Metalworking Industry as they arise.

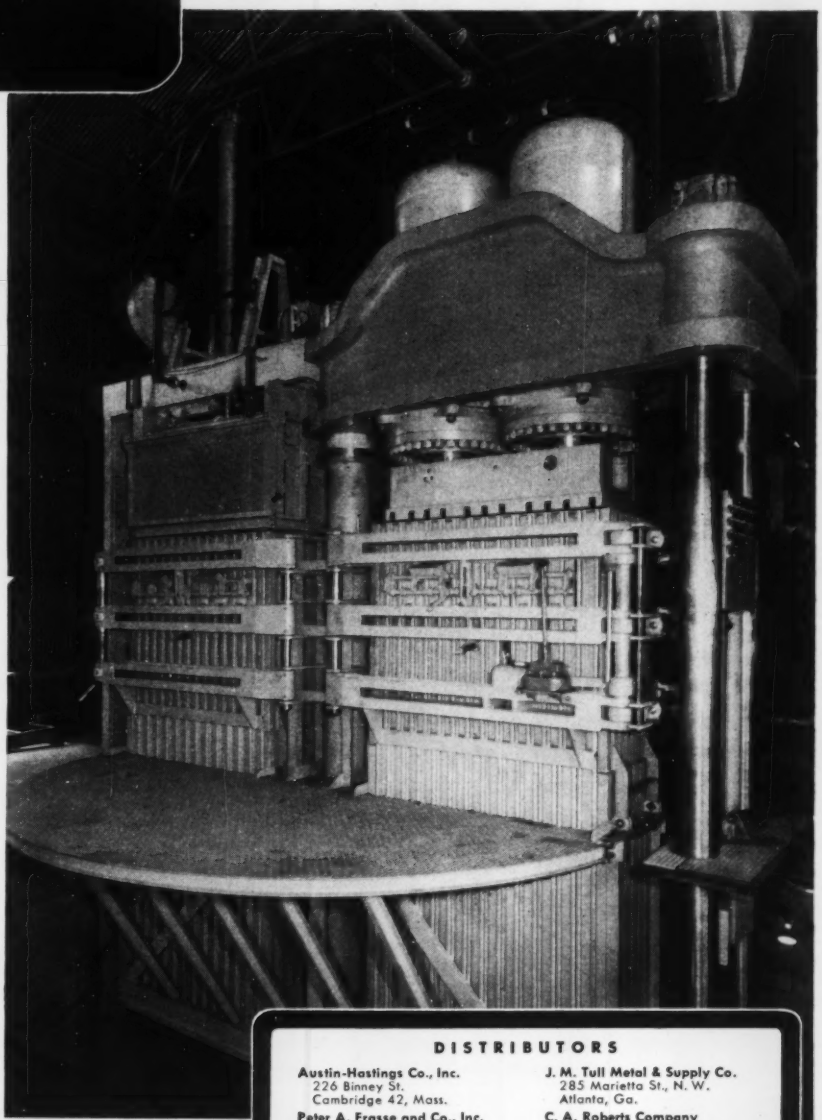
Progress Is Our Most Important Product

GENERAL ELECTRIC

...“the most important since Eli Whitney”

Versatile ACIPCO CENTRIFUGALLY SPUN Steel Tubes

"Delta" High Density Press, manufactured by Continental Gin Company of Birmingham, Ala. for a California cotton gin. Photo courtesy Continental Gin Company.



Designed for the cotton industry, this new hydraulic press permits an operational economy which has been called "one of the most important moves in the industry since Eli Whitney invented the cotton gin."

This press produces high density bales at the cotton gin, eliminating the need for extra compression of standard density bales before export shipment. Cotton bales from this press measure only 21″ x 23″ x 54″.

The first cotton baling press of its size, it operates at a hydraulic pressure of 2,000 psi, and exerts a total force of 1,650,000 pounds. Both of its main hydraulic cylinders were made from 23″ OD Acipco steel tubes.

Because they are centrifugally spun, Acipco steel tubes possess a uniform, highly dense, non-directional grain structure which is easier to machine, yet stronger and tougher. This quality, and others, can mean important economies in your application — both for you, and for your customer. Find out how by calling or writing your nearest Acipco distributor today.

SIZE RANGE: Lengths up to 16′ — longer lengths by welding tubes together. OD's from 2.25″ to 50″; wall thicknesses from .25″ to 4″.

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

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That is exactly what we can offer you at Lindberg. A design and engineering staff concerned only with the development of equipment for applying heat to industry. This staff produces the most complete line of such equipment in the industry—heat treating furnaces, melting furnaces, ceramic kilns, high frequency induction units; big ones, small ones, electric or fuel-fired, built in our own plant or field-erected.

Whatever your requirements Lindberg's staff will study them without prejudice recommending the correct equipment to fill them whether you need only a simple heat treating furnace or a specially designed and developed installation to answer an exceptional problem in a newly-efficient way. You can be sure you have the right answer when you leave it to Lindberg. Get in touch with your nearest Lindberg Field Representative. (See your classified telephone directory or write us direct.)

This Lindberg Carbonitriding and Carburizing Furnace (electric or fuel-fired) is one of the most widely-used heat treating units in the world.

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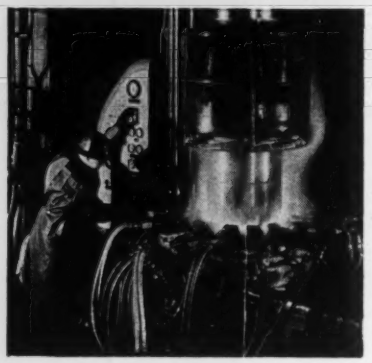

You need MORE than these to Heat Treat Metals!

The science of heat treating has become of vital importance to many manufacturing operations. Without the radical improvements of the properties and characteristics achieved in metals and alloys by heat treating, many of the nation's most important products could not be made.

To perform the appropriate type of heat treatment, such as annealing, normalizing, quenching, tempering, carburizing, controlled atmosphere hardening, stress relieving and others requires specialized, intricate, and expensive equipment such as is illustrated here.

But *more* than such equipment is needed. The most modern and highly specialized equipment is useless without the correct combination of operational skill and technical experience that has been developed over years of practical operating practice. Equipment and materials are important, but the *essential* factor in heat treating operations of all kinds is the human touch and the practiced hand.

The members of the Metal Treating Institute listed here are the recognized leaders of the commercial heat treating industry. They are specialists possessing the equipment, the technical skill, the years of experience, and the personnel with which to solve your heat treating problems all under one roof.

When you need complete heat treating services or want consultation concerning heat treating or engineering or design problems, write any of the companies listed. All inquiries will receive prompt attention.

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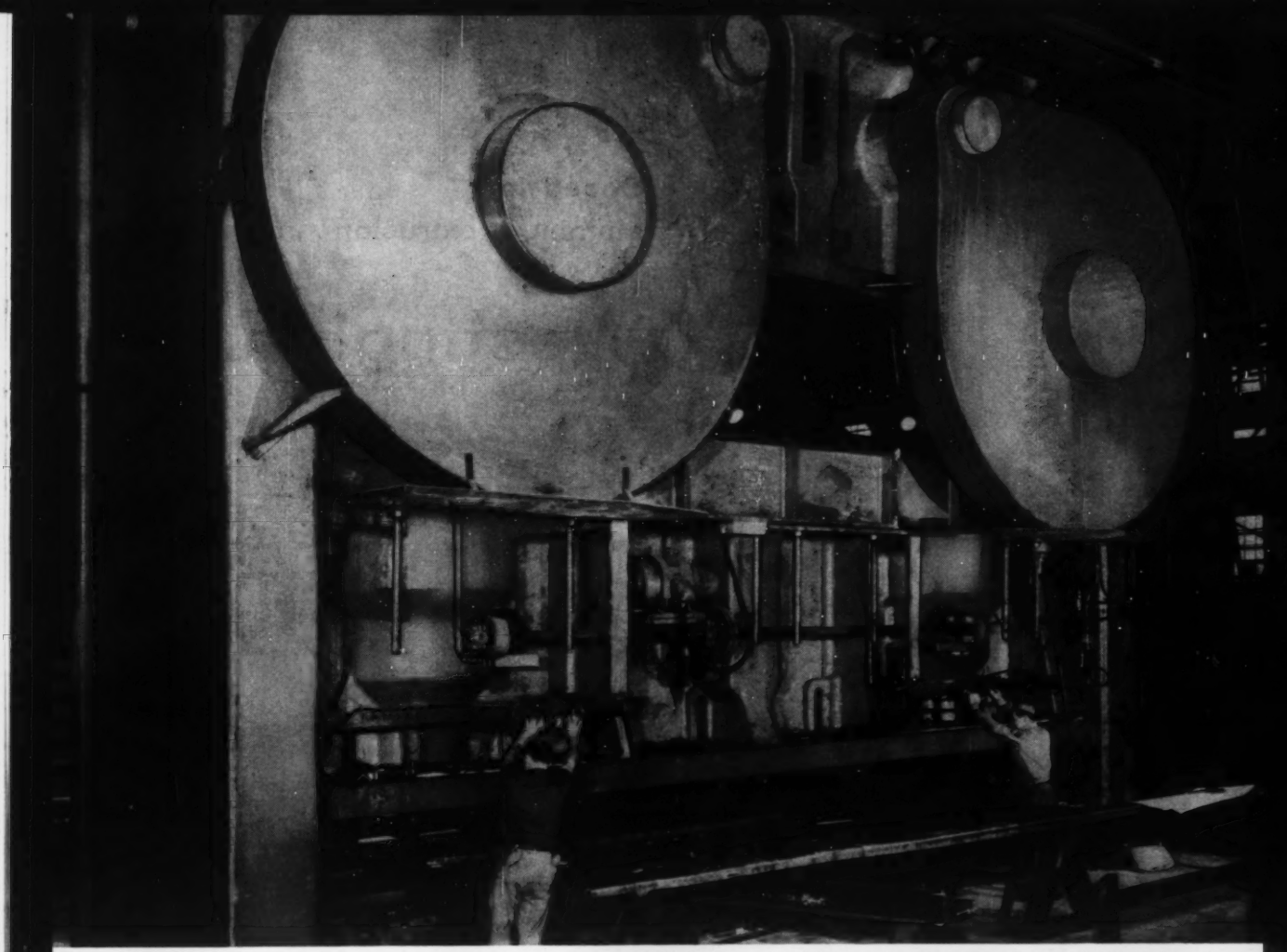

For the better part of 3½ years, this giant press—largest of its kind—has operated three shifts a day, seven days a week, doing with a single hit what formerly required two forming operations on a 3000-ton press.

4000-ton Hamilton press produces formed truck and bus rails from flat blanks in a single hit

By producing completely formed side rails from flat blanks in a single operation, this press has eliminated costly and time-consuming die changes, storage of partly formed rails between operations, and attendant materials handling problems. It does not give camber, or bow, to the rails and so this huge Hamilton press has eliminated the need for intermediate and final straightening operations.

Simplicity of lubrication is an important factor in the successful operation of this press. A special system, built in during installation, results in positive, efficient oiling of all moving parts with foolproof ease.

For all its 4000-ton capacity, the press weighs only 900 tons, stands only 43 ft. high, and is only 30 ft. 10 in. wide, 12 ft. 10 in. deep. It is driven by a 150 hp motor turning up 1200 rpm. The stroke is 22 in., operating speed is seven hits per minute.

Write to Hamilton Division, B-L-H Corporation, for full information and specifications on the line of Hamilton heavy duty presses.

Low-carbon sheet steel side rail blanks up to 26½ ft. long by 3/8 in. thick are fed into the press at the Cleveland Plant of Midland Steel Products Company. The operating crew varies from four to eight men, depending on size of rails being formed.

Hamilton Division Hamilton, Ohio

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Diesel engines • Mechanical presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

Speed for
aluminum extrusion . . .

Westinghouse

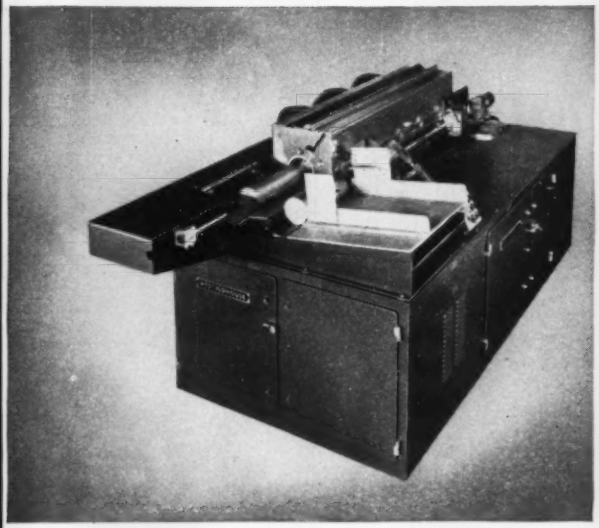
1. Greater efficiency in aluminum billet extrusion results from the speed and adaptability of Westinghouse induction heating.

C. P. Bernhardt
Engineering Manager,
Induction Heating Dept.

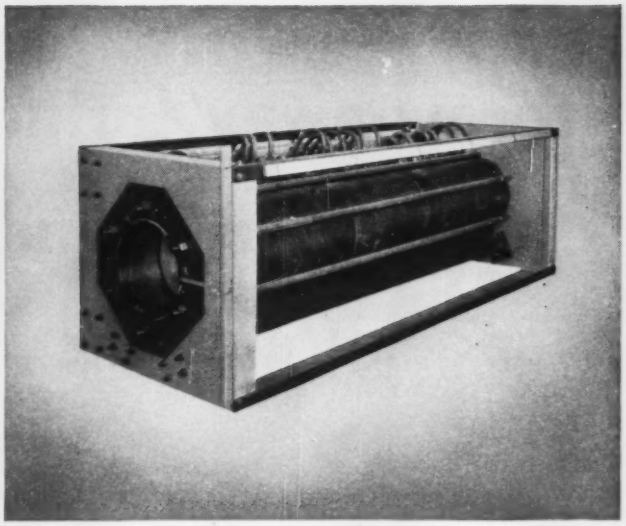
EXAMPLE: "Five thousand pounds an hour of 6-inch aluminum billets", reports Carl Bernhardt, "are heated to 1,000°F for heavy extrusion press operation." In supplying induction heating for this customer, Westinghouse saved 37% of the floor space needed for conventional furnace operation. Most important, high operating efficiency results from these five advantages in speed and flexibility:

- Short, 3-minute, start-up time. Stand-by heat losses are low.

induction heats billets on the run



2. Heating 6- or 8-inch billets to 1,000°F, this Westinghouse induction unit delivers up to 5,000 lbs of billets an hour.



3. Westinghouse coil design and engineering assures uniform heating from billet core to surface.

- Up to 80% cut in maintenance time and costs.
- Longer die life due to uniform billet heating... accurate, repetitive temperature control.
- Cooler, more productive working conditions.
- Pushbutton, automatic cycling of billet heating and handling directly to the extrusion press pickup.

For problem solving, call on Westinghouse technical leadership in induction heating research, design and engineering. You can be sure of complete service, too, through installation field engineering and follow-up. See your local Westinghouse industrial heating sales engineer or write, Westinghouse Electric Corporation, Induction Heating Dept., 2519 Wilkens Ave., Baltimore 3, Md. J-10450-X

The Westinghouse Heat-Treating Family

GAS • ELECTRIC • INDUCTION

YOU CAN BE SURE... IF IT'S

Westinghouse

New Style KSDN Kendex Tool designed for turning, profiling and chamfering in either direction

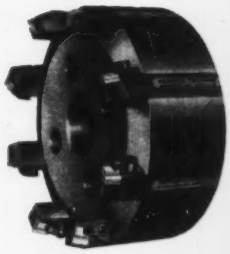
KENDEX* turnover "throw-away" principle adaptable to many special cutting jobs

Quick, accurate indexing . . . fast tool changes . . . *no* costly grinding . . . all of which add up to higher production with lower tool investment and minimum maintenance costs.

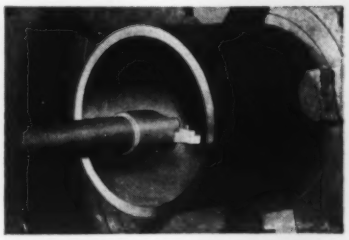
These are the Kendex advantages that have resulted in adaptation of Kendex to many *special* job applications; odd job milling, step milling, face milling, and boring, chamfering, turning, and profiling operations. A few adaptations of the Kendex design principle to varied cutting problems are illustrated.

But, no matter if it's a special or a standard machining operation, Kendex Tooling provides many distinct advantages. In addition to quick, accurate indexing, without resetting the toolholder, and the elimination of all grinding, Kennametal* "throw-away" button inserts reduce machine down time and speed up production.

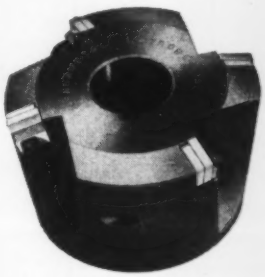
Why not let a Kennametal tool engineer help you select the right Kendex Tooling for each job . . . special or standard. By training and experience, he is qualified to analyze tooling problems and recommend right solutions. Or write KENNAMETAL INC., Latrobe, Pennsylvania.



Eight standard Kendex Tools adapted to odd job milling



Boring bar equipped with standard Kendex Tooling



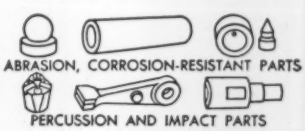
Special 4-step boring head with adaptation of standard Kendex "throw-away" inserts and clamp mechanism

Kendex Boring Bar uses Kennametal "throw-away" inserts and Kennametal chip breakers.

*Trademark

B-8991

INDUSTRY AND KENNAMETAL ...Partners in Progress



AMERICAN ORIGINALS IN IRON AND STEEL

The dry creek that stopped the furnace

In 1792, America's infant iron industry had spread as far west as Kentucky. In that year, a furnace was erected by Jacob Meyers on Slate Creek in Bath County.

The undertaking was a slow and laborious one. Essential supplies had to be packed through the wilderness. Timbers and stone were hewn and set by hand. Flash floods were a constant threat, and Indian raids an ever-present menace.

Finally, after a year of patient toil, the operation was completed. The great mill wheel churned, the bellows pumped and the furnace roared . . . but not for long. As the southern sun beat down, Slate Creek fell from a turbulent stream to a timid trickle. The mill wheel stopped, and so did production . . . until welcome rains once more filled up the dry flood gates.

Modern-day producers, of course, aren't exposed to such production hazards. But, there are others which you can eliminate by using Baker's MAGDOLITE. This carefully developed product will assure you of uniform ingots and lowest refractory costs. This is because MAGDOLITE has proved itself 5 ways better . . . in composition, preparation, strength, economy, and quality. Don't just say dolomite, specify Baker's MAGDOLITE . . . and be SURE!

ANOTHER AMERICAN ORIGINAL

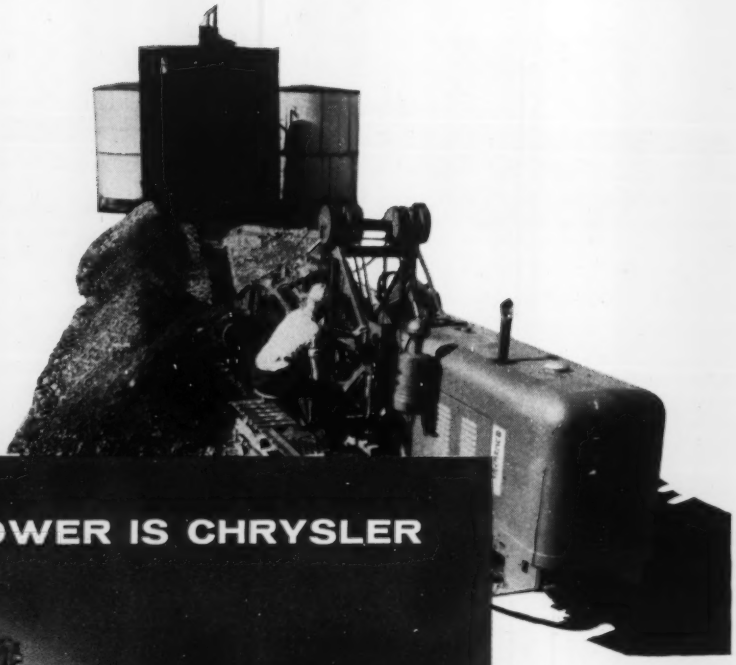
JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE
The original dead-burned dolomite

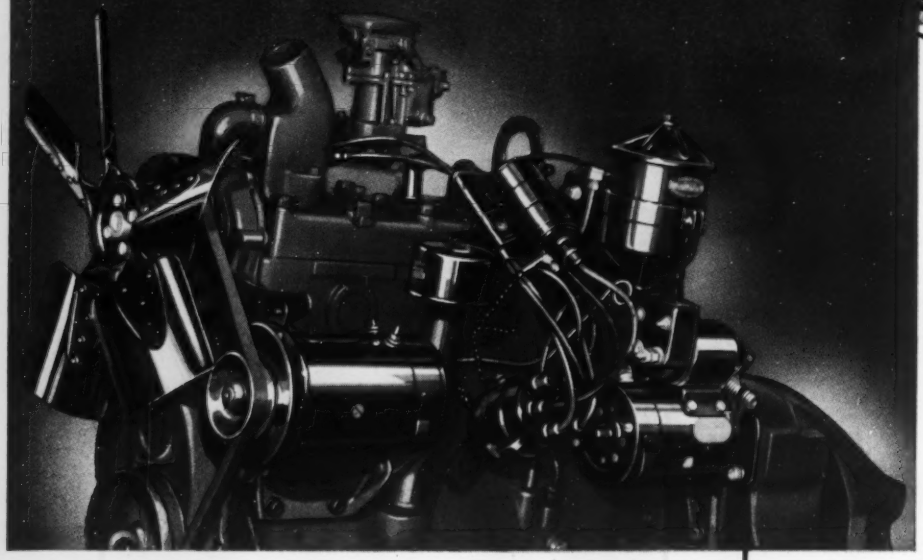
THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

pitch in and ditch...



THE PAYOFF POWER IS CHRYSLER



This Gar Wood-Buckeye 308 Ditcher is designed for really rugged digging. Cross-country pipelining—the toughest gas, water, sewer, conduit and cable lines. Jobs that require day after day after day of high production service. That's why it's equipped with two-speed excavator drive, hydraulic conveyor drive, front drive transmission . . . powered by Chrysler!

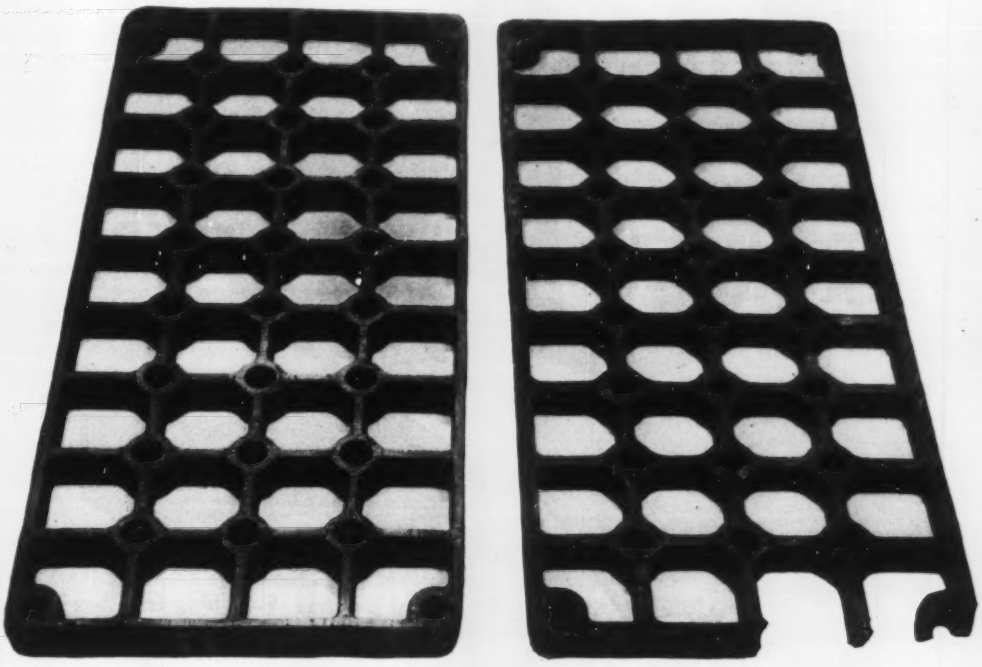
CHRYSLER INDUSTRIAL 32

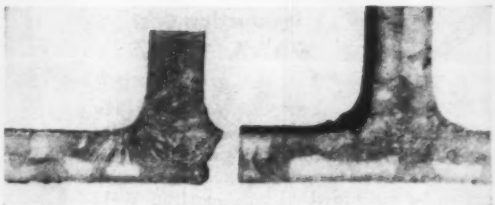
in-line 6 Engine (265 cu. in. displacement) powers Gar Wood-Buckeye Ditchers—and many other makes of equipment in the construction and materials handling field. There are five Chrysler in-line 6s, two V-8s—ranging from 230 to 413 cu. inch displacement. For detailed information about Chrysler Industrial Power write: *Dept. D3, Industrial Engine Division, Chrysler Corporation, Detroit 31, Mich.*

Chrysler
INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

THE TALE OF TWO TRAYS





THERMALLOY TRAY—hot acid etch made after removal from service. Note that through proper chilling and foundry practice, most cracks are superficial.

COMPETITIVE TRAY—hot acid etch after failure shows severe shrinkage and cracking. This tray was in service *less than half* as long as the Thermalloy tray.

THERMALLOY* QUENCH TRAY
GIVES TWICE THE SERVICE LIFE

At a major automotive plant, two sets of quench trays were recently ordered for carburizing shafts at 1650 F. Both were of standard design. One set was cast by Electro-Alloys of Thermalloy heat-resistant alloy—the other was a competitive make.

The illustrations above clearly show the condition of the two test trays . . . after the Thermalloy trays had been in service *more than twice as long* as the competitive make. Use of chills at critical points and proper foundry technique in the Thermalloy trays accounted for their much longer service life . . . by eliminating the shrinkage evident in the competitive tray. This test, made by the customer, clearly proved the added quality and strength achieved through the use of chills.

Whatever *your* heat-treat problem, it pays to make use of Electro-Alloys casting know-how—plus the outstanding physical properties of Thermalloy high-heat-resistant alloys.

For further technical information on Thermalloy Heat-Treat Trays, write for Bulletin T-227 . . . Electro-Alloys Division, 8043 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.

AMERICAN Brake Shoe COMPANY **ELECTRO-ALLOYS DIVISION** Elyria, Ohio

COST

IS A BIGGER WORD THAN EVER!

RINGS ROLLED & FLASH-WELDED from a Mill-Rolled Section

SAVED $220.63 EACH

A ring originally designed as a casting weighed 390 lbs. and cost $280.00. Later it was purchased from Amweld, as a rolled and flash-welded ring made from a contoured mill-rolled shape. More than triple savings resulted. Basic cost dropped to $59.37 and weight was reduced to 94.5 lbs. In addition, considerable time and money were saved in the finished machining operation.

Switching to Flash Butt-Welding of Mill-Rolled Sections Slashed Production Cost 76½%

SAVED $103.46 PER RING

Rough rings purchased by a well-known manufacturer of jet aircraft engines weighed 135 lbs. each. Most of this weight was excess metal which had to be machined away. American Welding's Industrial Products Division, working with this company, studied the product and recommended a flash butt-welded ring, formed from a special mill-rolled shape. Adopting this new ring saved 88 lbs. of metal and eliminated much of the machining time required.

American Welding can help cut costs in your plant by suggesting the use of rings rolled and flash welded from mill-rolled or extruded shapes.

THE AMERICAN WELDING & MANUFACTURING CO.
110 Dietz Road • Warren, Ohio

Contact the Industrial Products Division of The American Welding & Manufacturing Company. We will be glad to show you more actual cases of cost savings.

AMERICAN WELDING

The World's Leading Manufacturer of Welded Rings

STEEL
March 11, 1957

Metalworking Outlook

Inventories: No Drop in Sight

"Even if the rate of accumulation of inventories drops from the moderately high rate of the last quarter of 1956, no general decumulation is likely at the present time. Inventories are too low for that." So says Harvard Economist Sumner H. Slichter. The book value of inventories held by manufacturers amounted to $51.9 billion at the end of January. That was $300 million above the mark a month earlier and $5.2 billion above the year-ago figure.

Business Takes a Breather

Business activity is on a plateau, believes Dr. Slichter. But it will rise moderately in the second half. Two factors account for the economy's pause to catch its breath: 1. A drop in the rate at which business enterprises were accumulating inventories. 2. A decision by some enterprises to conserve cash to finance large programs of expenditures on plant and equipment. In last year's fourth quarter, stock accumulation was going on at an annual rate of $4.4 billion—50 per cent higher than the normal pace. One clue to the fact that industry is conserving cash is that the annual rate of dividend disbursements dropped in December well below the level of any month in 1956 and even below 1955's monthly average.

New Car Stocks Up

Unsold stocks of new cars in dealers' hands are rising. They numbered about 750,000 at the end of February. While that still is some 150,000 below the record 900,000 a year ago, it still represents a rise of 200,000 since the first of the year. It's also 110,000 higher than they were at this time in 1954 and 185,000 higher than in 1955. But dealers' consensus is that stocks are not yet seriously high, provided the expected March pickup in sales materializes.

Sales, Orders Rise Moderately

Manufacturers' sales rose more than seasonally during January; new orders increased by the usual seasonal amount; and unfilled orders were a shade below December's, reports the Commerce department. Manufacturers sold $28.7 billion worth of goods in January, $900 million more than December sales and $2.3 billion higher than sales in January, 1956. New orders received by manufacturers rose to $28.6 billion in January from $28.2 billion in December and $27.5 billion in the year-earlier month. Manufacturers' unfilled orders showed a decline of $100 million during January to a total of $62.3 billion at the end of the month. But the end-of-January level was still $5.7 billion above that of a year earlier.

Scrap Export Rules Eased

Look for the freeze on exports of heavy melting steel scrap to be lifted within 30 days. Normal licensing of all steel scrap exports to Japan, United

Technical Outlook—p. 153 Market Outlook—p. 227

Metalworking Outlook

Kingdom and the European Coal & Steel Community was suspended Feb. 27, but reinstated on all but heavy melting (see page 249). Hardship applications for heavy melting licenses will be considered now. Restrictions have also been lifted on copper-nickel alloy scrap containing at least 40 per cent copper and 5 per cent nickel, if the license applicant guarantees at least 90 per cent of the nickel content will be returned to the U.S. in the form of nickel metal. Commerce has also boosted the export quota of aluminum scrap and aluminum remelt ingot from 5000 to 7000 net tons in the first quarter. The second quarter quota is 8000 net tons.

Alarm in Labor

Union bosses are alarmed about the bad press they're getting from the Senate probes. Warns James B. Carey, president of AFL-CIO's electrical workers: "We should not wait for state legislatures, grand juries or congressional committees to do the work for us." He advises: 1. Some union constitutions badly need rewriting. 2. Some unions need to adopt ethical practice codes. As more scum comes to the surface in the Washington hearings, watch for the unions' self-analysis trend to hit a new high.

Coming: More State Labor Curbs

Because of the racketeering hearings, labor may be in for a rugged time in many state capitals. In the offing is new regulatory legislation on welfare fund management and even some matters that haven't figured in racketeering at all, notably the right-to-work laws. Indiana has just voted one in that will go into effect this summer, despite the violent protests of unions.

Change in Tin Plate Pricing?

There's talk that the guaranteeing of tin plate prices for six-month periods will be abandoned at the end of the next contract period—Oct. 31. Tin plate then would be priced like any other steel product—price in effect at time of shipment. The present six-month period will end Apr. 30, so new price schedules will be announced soon. Can producers were in conference last week with their suppliers of tin plate in accordance with the 50-day notice in present contracts.

Straws in the Wind

"Steel production will hit 120 million tons, possibly more, in 1957," predicts Jack L. Ashby, Kaiser Steel Corp. vice president . . . Jones & Laughlin Steel Corp.'s No. 2 blast furnace at Aliquippa, Pa., will be taken out of production for a complete relining job after 20 years' service . . . Aluminum Co. of America will join with Surinam (formerly called Dutch Guiana) to build a hydroelectric power and aluminum smelting development . . . St. Joseph Lead Co. has discovered a major iron ore deposit in Missouri and is considering a 50-50 deal with Bethlehem Steel Corp. to develop the property.

QUALITY CONTROL REPORT

These sparks reveal vital facts about quality control of steel

You are naturally interested in the quality of your finished products—and if you use steel in making them, you should know about the Ryerson quality controls symbolized by this spark test.

Here a skilled Ryerson inspector is checking the carbon content of a steel bar by "reading" the sparks thrown off by an abrasive wheel. It's an amazingly accurate method of making sure that you get exactly the steel you order.

And this is only one of many rigid quality controls that protect you in every purchase of steel from Ryerson stocks. For example, a heat symbol identifies every bar of alloy steel to avoid the problem of variation from heat to heat. Another example: cylinder tubing can be furnished to more accurate inside diameter through Ryerson specs controlling O. D. and I. D. instead of O. D. and wall.

The result: steel of certified quality—assured by exacting Ryerson controls, whether your product calls for carbon, alloy or stainless steels. And these quality controls become *your* quality controls in your finished product.

These are important points to remember when you specify or purchase steel. You get extra value every time you order from your nearby Ryerson plant.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

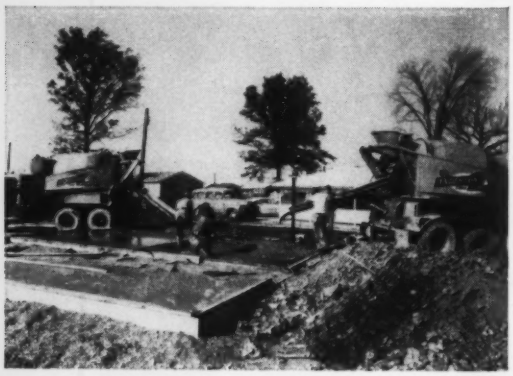
JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

DSC Electro-Welded Wire Fabric Makes Concrete Crack Resistant

...puts lasting strength in pavements, structures, pipe and other precast concrete products

DSC PHOTO

This is a new highway between Detroit and Toledo. Reinforced with DSC Fabric, it will shrug off the beating it will get from heavy traffic and extreme weather conditions.



DSC PHOTO

This concrete slab (DSC Fabric-reinforced) will help keep the new building livable longer by guarding it against cracks, leaks, vermin and other destructive forces.

Courtesy Lamar Pipe & Tile Div., American Marietta Corp.

Here is a giant-size section of a DSC-Fabric-reinforced 120" LO-HED concrete pipe. The nation's pipe mileage is steadily lengthening for sanitary and storm sewers, highway and railroad culverts and for drainage uses generally.

DSC Welded Wire Fabric—sometimes called "mesh"—is "woven" at our Portsmouth (Ohio) mill. Its "fibers" consist of Portsmouth Bright Basic Low Carbon Reinforcing Wire.

The "warp" and "woof" intersections are electrically welded. That way the mat virtually becomes a continuous lattice-work.

Here, again, the PROOF of the FABRIC is in its PERFORMANCE . . . its ability to impart the necessary tensile strength to the concrete to resist estimated stresses and strains. The important factors are sound welds and conformity of wire quality, sizes, spacings and overall dimensions to the engineering specifications.

Your nearest DSC Customer "Rep" will give you further information on Welded Wire products and their uses . . . or on other DSC Rod and Wire products or on Sheet and Strip steel.

Call him . . . Today?

Customer Satisfaction Is Our Business

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio., Dayton, Ohio., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, St. Louis, Toledo, Worcester, Mass.

DSC MILL PRODUCTS

PORTSMOUTH DIVISION, PORTSMOUTH, O.

Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon Manufacturers' Wire
High Carbon Specialty Wire • Aluminum Cable Strand Reinforcement
Rope Wire • Tire Bead Wire • Welded Wire Fabric

DETROIT MILL DIVISION, DETROIT, MICH.

EASTERN MILL DIVISION, HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

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"Where Are We Going?"

The lively interest in management development among metalworking managers was recognized by the editors when we scheduled two articles on the subject in the Program for Management—1957. But we were a little surprised by the hundreds of letters of comment and requests for reprints that followed the publication of the first ("The Care and Feeding of the Junior Executive," page 93, Feb. 11).

We wanted to learn what levels of management were most interested in the subject. So we made a painstaking analysis of our correspondence.

Thirteen per cent of the letters came from corporate officials of metalworking companies, primarily presidents and vice presidents. Presumably, these men have the authority to institute management development programs in their companies.

Twenty-six per cent came from major division and department heads, including such titles as general manager, works manager, plant manager, division manager, general sales manager and chief engineering manager. Presumably, many in this group have authority to start or lead development programs.

The remainder, 61 per cent, came from a variety of middle and lower management titles. Most frequent were general superintendents, plant superintendents, purchasing directors and agents, master mechanics, production engineers, project engineers, directors of organization development, directors of personnel, manufacturing engineers, industrial engineers and some two score other titles. Many names bore no title at all. Presumably, the interests of this group lean more toward participating in a development program.

The breadth and depth of interest in management development is not only gratifying to the editors but is, we believe, an extremely healthy omen for business. It suggests an awareness of the importance of building more skills to handle the increasingly complex jobs involved in running industry. It inevitably will result in better programs for the building of future managers, and to this end we'd like to offer a suggestion.

An essential of any planned program is a periodic evaluation of each individual's performance. It not only provides top management with a continuing inventory of personnel. It also answers questions most frequently asked by junior executives: How Am I Doing? Where Am I Going? To only a slightly less degree do the same questions arise in the minds of middle managers.

If planned management development programs did no more than keep junior and middle managers informed on how they are going and where they are headed, such programs would well justify their support.

But, of course, they can do much more.

Walter J Campbell

EDITOR

How to have factories in every city...ship United!

Electric motors being loaded aboard DC-6A Cargoliner are checked by United's W. S. Emrich and Reuland's W. L. Johnson (right).

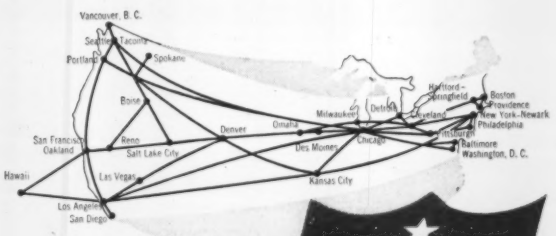
Reuland Electric Co. makes electric motors, many on special order. Reuland's reputation for prompt delivery is known coast to coast. "Our customers couldn't get better service if we had factories in every city," says Reuland's Western Div. Sales Manager, W. L. Johnson. "As it is, the motors are made to order here in Alhambra, California, shipped overnight by United Air Freight."

Shipping United has important competitive advantages for companies like Reuland: wider markets, lower inventory, savings in packaging and insurance. Plus guaranteed space dependability (Reserved Air Freight), door-to-door service, modern cargo handling procedures, round-the-clock flights featuring the world's fastest passenger and all-cargo planes. Ship United!

Examples of United's low Air Freight rates

	per 100 pounds*
CHICAGO to CLEVELAND	$4.78
DENVER to OMAHA	$6.42
NEW YORK to CHICAGO	$7.50
SEATTLE to LOS ANGELES	$12.02
PHILADELPHIA to PORTLAND	$24.15
SAN FRANCISCO to BOSTON	$27.00

*These are the rates for many commodities. They are often lower for larger shipments. Rates shown are for information only, are subject to change, and do not include the 3% federal tax on domestic shipments.



Door-to-door service

SHIP FAST...SHIP SURE...SHIP EASY

UNITED AIR LINES

For service, information, or free Air Freight booklet, call the nearest United Air Lines Representative or write Cargo Sales Division, United Air Lines, 36 South Wabash Avenue, Chicago 3, Illinois.

Modern Homes

Prefab Home Sales Pick Up

	Prefabs Built	% Prefab	Total Homes Built
1957*	80,000	8.0	1.0 million
1956	79,000	7.1	1.1 "
1955	93,000	7.1	1.3 "
1954	77,000	6.4	1.2 "
1953	55,000	5.0	1.1 "
1949	35,000	3.5	1.0 "

*Estimate.
Sources: Prefabricated Homes Manufacturers Institute. Department of Commerce.

Prefab Builders Expand

LEADERS in the prefabricated home industry have set a goal: By 1970 they hope at least 50 per cent of all private residential homes will be prefabricated. Success of the industry in increasing its share of the new home market this year, plus developments in the mass-produced curtain wall construction in the next two or three years, should indicate whether they'll reach that goal.

Optimism — Home building in 1957 will provide a test of strength. Prefab manufacturers expect to hold their own and possibly gain a slight sales increase this year (see table), even though total new home construction will dip 10 per cent or more (see STEEL, Dec. 10, 1956).

The tight money market hit the prefabbers where it hurt most — the VA-FHA home buyers who purchase 80 per cent of these homes. But the situation served to point up prefabs' strength: While VA-FHA financed construction dropped 31 per cent over-all in 1956, prefab sales to this market dipped only 22 per cent, says George Price, president of National Homes Corp., Lafayette, Ind.

Outlook—Little or no improvement in the money picture is seen this year. But these builders feel they'll gain a bigger share of the new home market because:

1. Their mass-production techniques provide a bigger and better home for the prospective buyer's dollar.

2. They're expanding sales territories and increasing dealerships.

3. The momentum of rapidly increasing public acceptance of the prefabricated home should bring extra sales.

More Metal—Metalworking's interest in the prefabricated home industry is obvious: Prefabbers put more metal into their homes than do builders of conventionally constructed homes. Some examples:

National Homes, which sold nearly 17,000 houses in 1956, includes Youngstown steel kitchen units with each home.

Modern Homes Corp., Dearborn, Mich., offers buyers a choice between aluminum sliding windows and redwood units. George D. Lytle,

executive vice president, predicts 75 per cent of the homes will contain aluminum window units this year. Modern Homes was also the first to use a steel trusslike floor joist system and currently ships 50 per cent of its homes with the system.

Harnischfeger Homes Inc., Port Washington, Wis., constructs all its homes with steel window units. It offers steel kitchen cabinets as optional equipment—40 per cent of sales last year included them.

Quality, Price — Challenge the prefab builders: "We'll use more metal when it helps us build a better home at a better price." Some builders, like National Homes, are including plumbing packages with homes. Many have tried—a few are installing—metal doors for interior use.

Though it failed financially, the ill-fated Lustron Corp., Columbus, O., proved in the immediate postwar period that a good all-metal prefabricated home can be built. But as metal curtain-wall building techniques continue to improve, you can look for their application to home construction.

All Steel — The biggest breakthrough toward the all-metal home was announced at the National Home Builders Association convention in Chicago. U.S. Steel Homes Division of U.S. Steel Corp. introduced its new Steelaire home which uses about 6.5 tons of steel in its construction.

Its features: The all-steel structural system employs modular construction. Panel frames are made of cold-rolled, copper-steel channels that have been Bonderized and painted for permanent protection. All interior panels are steel framed. The roof is constructed of a steel trusswork; gable ends, gutter board, rake facia, eave and rake soffits, closet doors and all cabinets are of steel.

Advantage — "The transition from wood to steel enables wider mass-production efficiency with precision parts," says H. D. Moulton, president.

Prefabbers like to compare themselves to the auto industry. The idea of prefabricated homes had to be sold first—acceptance is growing. Then mass-production techniques had to be developed to give the mass market for lower-priced homes a bigger dollar value than conventionally built homes. They feel they're doing that.

Plans—Next, the industry plans to invade the higher priced home market. Some have done it already: Modern Homes says 75 per cent of its sales are in the $12,000 to $20,000 market; 20 per cent to the over $20,000 market. About 80 per cent of the prefab homes are still sold for less than $15,000.

All-Steel School Prefabbed

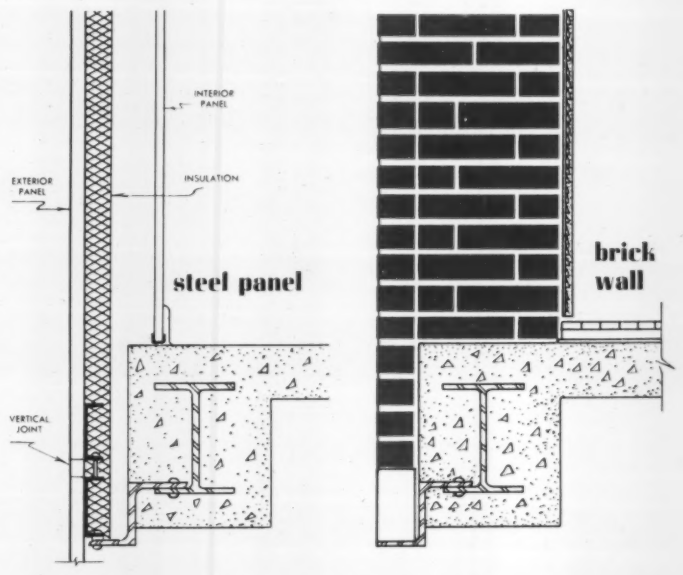
METAL curtain wall construction is catching on fast. Latest target: The nation's tremendous shortage of classrooms.

U.S. Steel Corp. and Structo Schools Corp., Boston, have developed a new all-steel school employing curtain wall construction. Basic features: Fast erection time, minimum maintenance, flexibility, costs below conventional construction.

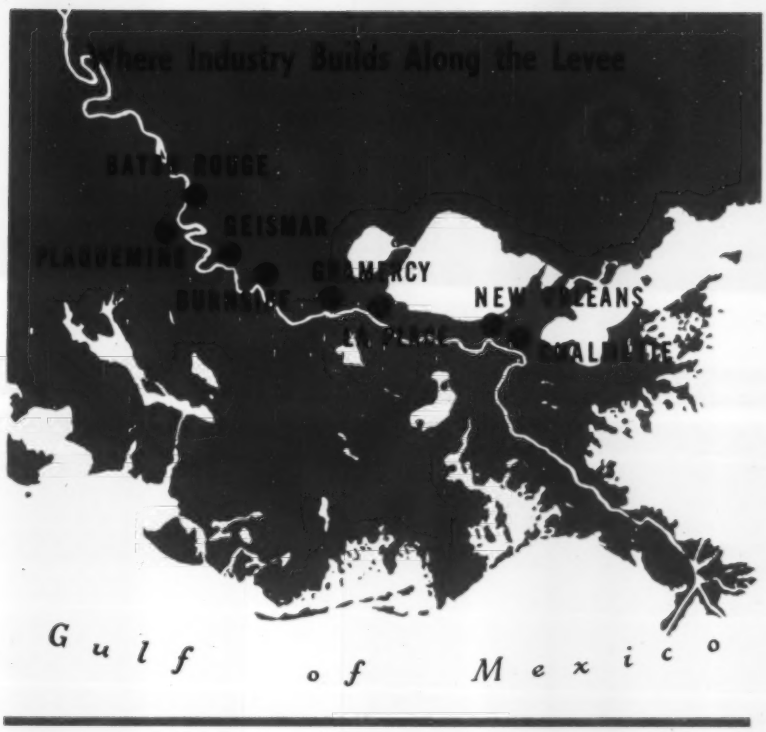
Construction—Steel panels going into the curtain walls are fabricated in the plant of U.S. Steel's U.S. Steel Homes Inc. at Harrisburg, Pa. The 2½-in. thick panels are "sandwich" constructed — exterior is 16 gage porcelainized steel; middle layer is mineral wool insulation; interior is 26 gage porcelainized steel laminated to Masonite with a foil backup vapor barrier.

In school construction, steel square tube columns and bar joists support the building on a concrete foundation. The roof is galvanized steel covered with insulation, tar and gravel.

Prototypes—A six-room prototype was built near Gary, Ind., last November. The American Bridge Division of U.S. Steel erected the $120,000 structure in 60 days. A 12-room, $360,000 school was erected in Emmitsburg, Md., in 18 weeks.



Steel curtain wall vs. conventional brick construction: 2½-in. thick steel panel (at left) provides the same resistance to sound and heat transmission as 12-in. thick masonry wall. Steel panels weigh only 8 lb per square foot, compared with masonry at 80 lb per square foot



Action on Old Man River

Louisiana's oil boom in the delta has been joined by big upriver growth. At least $300 million in new plants is moving in between New Orleans and Baton Rouge

A CHEMICAL-METALS complex is springing up in the quiet sugar cane fields between New Orleans and Baton Rouge, La.

Moving north from New Orleans you see plants which existed only on paper a few months ago already in various stages of construction:

- E. I. du Pont de Nemours & Co. Inc.—A Plastics Division plant at Laplace.
- Kaiser Aluminum & Chemical Corp.—A $60-million alumina plant (bauxite refining) at Gramercy.
- Olin Revere Metals Corp.—A $50-million alumina plant (bauxite refining) at Burnside.
- Wyandotte Chemicals Corp.—A $30-million caustic, chlorine and ethylene glycol plant at Geismar. It will furnish caustic to alumina and other plants.
- Dow Chemical Co.—A $50-million plant for making caustic, chlorine and other products at Plaquemine.

The Freeport Sulphur Co. has an option on land for the construction of a nickel-cobalt reduction plant at Gramercy. The nickel will come from Nicaro, Cuba.

Big Deal—This industrialization will cost at least $300 million.

In the heart of the area, near Laplace, a 4000-home planned community will be built by Webb & Knapp of New York. It will include a hospital, shopping center and recreational facilities.

Why They Come—What brings these industries to Louisiana?

1. Ample fresh water.
2. A deep water channel to the ocean—probably to be shortened soon by some 60 to 80 miles.
3. A big river, the Mississippi, that will accept huge quantities of industrial wastes without appreciable pollution.
4. Ten-year exemption from state taxes.
5. Warm climate—no frost protection is needed. Industry considers three hot months to be better than three cold ones.
6. Cheap land.
7. Big labor market.
8. Nearby oil and natural gas.

Forecasts—What the influx of industry (on top of the gulf oil boom) will do to the labor market is an unanswered question. One hint: New Orleans is full of West Virginia accents.

Money pouring into New Orleans is bringing new construction which rivals Pittsburgh's.

Louisiana politics (aside from New Orleans) hasn't broken from the Huey Long tradition, but big business is betting that as the state's standard of living rises because of the influx of new employers, political thinking will lean more toward the business view.

Kaiser Aluminum's reduction plant at Chalmette has a built-in hedge against political interference with its supply of natural gas. Three-quarters of the power plant load, or enough electricity to supply a city of 1 million, is carried by steam turbine-generators. The boilers are fired by natural gas but can be converted to coal quickly.

Kaiser soon will be shipping ingot to its Ravenswood, W. Va., rolling mill by barge. If necessary, barges can make the return trip with cargoes of coal.

Expansions — Oil and chemical plants in New Orleans are expanding. American Cyanamid Co.; Monsanto Chemical Co.'s subsidiary, Lion Oil Co.; and Shell Chemical Corp. have announced additions totaling close to $50 million.

This means big business for metalworking, especially in steel piling (the land is waterlogged), concrete reinforcements, structurals,

piping and chemical equipment of all types.

Lagging — Metal fabricators haven't followed the chemical-primary metals boom. They won't go where they can't find tool and die or machining services. Suppliers of such services don't want to move in without a market among fabricators. Both are being wooed.

The local shipbuilding industry which survived after the war on a diet of offshore drilling platforms is getting back to making ships.

One company, Avondale Marine Ways Inc., New Orleans, has diversified into products such as enameled steel panels for service stations.

The area looks ripe for the growth of metal fabricating companies making such items as air conditioners, appliances, utensils, furniture and fixtures, hardware and construction materials.

Porter Builds in Mississippi

H. K. Porter Company Inc., Pittsburgh, will build a chemical plant in Pascagoula, Miss., to produce magnesia and basic refractory products.

Completion of the $8-million facility is scheduled for early in 1958. The plan's site is a 400-acre tract on a channel which provides access to ocean-going vessels drawing up to 32 ft.

Parker Builds Sixth Plant

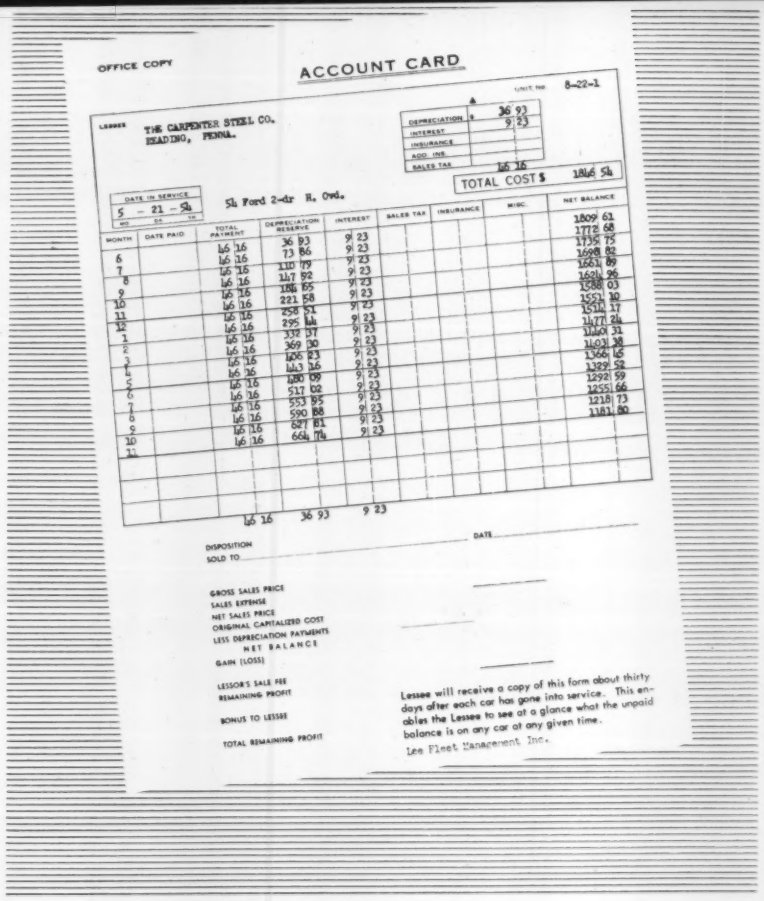
Parker Rust Proof Co., Detroit, is building a 40,000-sq-ft plant in St. Louis. It will be in full operation by June.

Hughes Builds for Electronics

A $6-million electronics plant will be built by Hughes Aircraft Co. in Fullerton, Calif., before the end of the year.

American Can Builds in Texas

Up to 275 million cans a year for beer and food products will be made in a $1-million plant American Can Co., New York, is building in San Antonio, Tex. The facility will cover 115,000 sq ft and employ about 150.



OFFICE COPY

ACCOUNT CARD

UNIT NO. 8-22-1

LESSEE THE CARPENTER STEEL CO. READING, PENNA.

DEPRECIATION	36 93
INTEREST	9 23
INSURANCE	
ADD. INS.	
SALES TAX	
	46 16

TOTAL COST $ 1846 54

DATE IN SERVICE 5 – 21 – 54

5h Ford 2-dr H. Ovd.

MONTH	DATE PAID	TOTAL PAYMENT	DEPRECIATION RESERVE	INTEREST	SALES TAX	INSURANCE	MISC.	NET BALANCE
								1809 61
6		46 16	36 93	9 23				1772 68
7		46 16	73 86	9 23				1735 75
8		46 16	110 79	9 23				1698 82
9		46 16	147 72	9 23				1661 89
10		46 16	184 65	9 23				1624 96
11		46 16	221 58	9 23				1588 03
12		46 16	258 51	9 23				1551 10
1		46 16	295 44	9 23				1514 17
2		46 16	332 37	9 23				1477 24
3		46 16	369 30	9 23				1440 31
4		46 16	406 23	9 23				1403 38
5		46 16	443 16	9 23				1366 45
6		46 16	480 09	9 23				1329 52
7		46 16	517 02	9 23				1292 59
8		46 16	553 95	9 23				1255 66
9		46 16	590 88	9 23				1218 73
10		46 16	627 81	9 23				1181 80
11		46 16	664 74	9 23				
		46 16	36 93	9 23				

DISPOSITION

SOLD TO

DATE

GROSS SALES PRICE
SALES EXPENSE
NET SALES PRICE
ORIGINAL CAPITALIZED COST
LESS DEPRECIATION PAYMENTS
NET BALANCE
GAIN (LOSS)

LESSOR'S SALE FEE
REMAINING PROFIT

BONUS TO LESSEE

TOTAL REMAINING PROFIT

Lessee will receive a copy of this form about thirty days after each car has gone into service. This enables the Lessee to see at a glance what the unpaid balance is on any car at any given time.

Lee Fleet Management Inc.

Auto lease accounts like this and other fleet deals help . . .

Put Salesmen on Wheels

"NEXT TO salesmen's salaries, automotive expense probably is the largest single item of expenditure incurred in sales activities," says Samuel J. Lee, president, Lee Fleet Management Inc., Cleveland.

Mr. Lee's assertion highlights a problem most firms face: "What method shall we use to put our salesmen on wheels?"

The common systems are salesman ownership, company ownership and fleet leasing.

First—Traditionally, most salesmen own their own cars and collect a mileage allowance to cover fuel, maintenance and depreciation costs. This method still is most popular, but it means the salesman has to buy his car on the retail market. And it often doubles as the family car, which sometimes means home needs come before business calls.

In addition, many companies overpay on mileage allowances to avoid bickering and dissatisfaction. Some 20 car rental agencies and fleet owners estimate the average mileage payment is 8 cents per mile, but the range is 4 to 12 cents, depending on car use and locality.

Still Good — Despite disadvantages, this type ownership works for firms that employ few outside men, or desire higher priced cars for prestige purposes.

L. A. Young Spring & Wire Co., Detroit, favors it. Tom Couper, general vice president, reports that about 25 sales representatives collect 8 cents a mile for use of their own autos.

Twenty other people, plant managers, inspectors and salesmen who

usually work within a 50-mile radius, receive a flat $60 monthly operating allowance instead of mileage payments. They also may submit a bill for first-class rail fare on trips over the 50-mile limit.

Says Mr. Couper: "We have a small sales force, so this system works best for us."

Type Two — Company owned fleets are well suited to large sales or service staffs which operate in a centralized area.

"It should cost about 6 cents a mile to operate a company owned fleet," estimates Mr. Lee.

But they require a large capital investment, careful supervision and usually call for garage and service equipment. A lot of paper work is a by-product. Companies are put in the risky business of disposing of used cars.

Third Way—Another possibility is fleet leasing. Rapidly gaining favor, it offers these benefits:

- Companies don't have to spend scarce capital for autos.
- Salesmen can have any kind of (low priced) car they want with almost any equipment and in any color. The leasing agency delivers a new car to the salesman every 12 or 15 months.
- In seven states, the leasing agency doesn't have to pay sales tax which makes for an annual saving of $60 to $80 per car.

Fast Growth—There are about 20 companies in the car leasing business, although some 2000 firms rent cars and trucks to others under one plan or another.

Mr. Lee estimates that these 20 firms have $225 million invested in motor equipment. The investment is increasing at a rate of 20 per cent annually.

The number of companies switching to leasing is growing at close to 10 per cent annually, he adds. One source figures at least 25,000 companies are car or truck lessees.

John Lott, president, Fort Duquesne Steel Co., Pittsburgh, has been leasing for several years. He says: "It enables us to give each salesman a new car every year at minimum cost to us. He can have a Ford, Plymouth or Chevy, whatever kind and color he wants. We don't have any paper work."

Types—The two basic leasing setups are flat rate and amortization payments. A flat rate rental costs about $80 to $95 per month for a low priced car. It includes maintenance, taxes, license and often insurance. It's best for individuals rather than companies.

The amortization plan often is financed under an equipment trust program in which large insurance companies are investors and owners of the equipment.

Method—Mr. Lee's firm is one of five or six which favor equipment trusts. It operates this way:

"A vehicle is purchased for a fixed sum to which is added transportation cost to the salesman's home, license plates, taxes and miscellaneous expenses.

"This sum is capitalized, and the leasing company is billed at a monthly rental rate which includes a predetermined depreciation rate, plus service and finance charges. (Nationally, the average leasing rate is about $50 per month per car.)

"The depreciation payment shows the book value of the car at any time, so it can be turned in when its market value still is on the plus side. This usually is between 12 and 15 months."

Result—The salesman takes care of maintenance, insurance and all operating expenses. He may be reimbursed by his company for everything but depreciation at a rate of 2 or 3 cents per mile.

The leasing agency acts as an expert service representative to handle buying, selling, delivery and all paper work. It buys at wholesale prices when the market is right and has its own used-car outlets to dispose of trade-ins.

Budd Shows Lighter Car

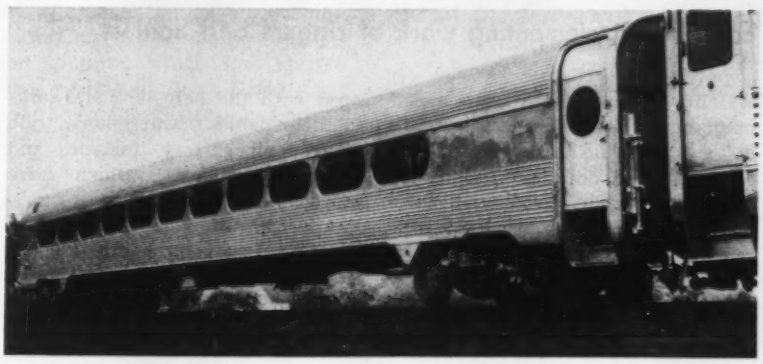
BUDD CO., Philadelphia, has demonstrated a new stainless steel railway passenger car on special runs of the Rock Island Railroad at Chicago.

Called Pioneer III, it weighs 52,330 lb, or 595 lb for each of the 88 passengers it will accommodate in its 85 ft length. A standard lightweight coach weighs 123,200 lb, or 1665 lb for each of 74 passengers.

Features include all stainless steel construction, extensive use of plastics for interior fittings and a lightweight four-wheel truck with air springs that weighs one-third as much as conventional trucks.

A basic unit can be used with head-on power or as a self-contained car. Since its length is equivalent to that of the standard railway car, it can be interspersed readily with other equipment.

The Pennsylvania Railroad has ordered six Pioneer III-type commuter coaches and has an option on 44 more. Total cost: About $9 million.



"Pioneer III" offers new economy of operation, unusual versatility. Standard coach lengths and coupler heights permit use of car equipment now in service

Moving Tips That Save Time, Trouble, Tempers

- Assign a member of the management team to co-ordinate and be responsible for the move.
- Have new machinery, overhead equipment, conveyor and pickling lines, etc., delivered to the new facility and installed prior to the move. Check out overhead cranes, material handling equipment thoroughly.
- Make a complete layout showing where each piece of machinery will be placed. Have the power system ready to go—electrical drops in and tested.
- Check with the building contractor to see that building, fire and sanitation inspectors have approved the new plant.
- Plan what equipment will be scrapped. It's a golden opportunity to drop product lines (and the equipment making these lines) which are no longer profitable but have been produced to satisfy a few old customers.
- Decide if it's a good time to standardize on purchasing methods.
- Get competitive bids from several riggers and movers. Ask for and check out references.
- Provide movers and riggers with details, such as ceiling heights, door openings and floor loads.
- Develop a simple coding system.
- Don't hesitate to be "offbeat." One company found that the most economical way to move machine tools from its multistory plant was to knock out walls, rebuild them later.
- Determine where plant personnel can assist.
- A crew of thoroughly oriented and capable "bird dogs" is a must. If you are moving one department at a time, have the supervisor follow the equipment from the old to the new facility.
- Run a shuttle service. Making trucks wait in convoy skyrockets costs.
- Study alternative moving times, including vacation shutdown, week ends, slack season, at night).
- Keep employees informed. It can spell the difference between a serious production dropoff or keeping within 10 to 15 per cent of current operating rates.

How To Ease Moving Pains

Good communications increase employee co-operation, keep production up. Company labor can help reduce moving costs by supplementing work of riggers and haulers

WHEN your company moves, a preplanned, detailed analysis and moving schedule can save time, confusion and dollars. The most important benefit: Production can often be held within 85 to 95 per cent of normal operating rates.

Prior to giving the "move out" order, sufficient time (depending on company product mix and size) should be devoted to planning the transfer of equipment. The accompanying check list was developed with the help of metalworking companies (warehouses, job shops, and battery, fastener and equipment makers) which have moved to new locations.

Approach — "The first step in planning a move," counsels C. F. Scheehle Jr., vice president-general manager, Wagner Litho Machinery Division, National-Standard Co., Secaucus, N. J., "is to analyze the shift and put one man in charge."

"Determining what new equipment must be purchased should be high on the list of things to do first," explains Jack Lang, comptroller, Adams Metals Co., New York. "It must be ordered with sufficient lead time," he adds.

Reduce Stock—Careful inventory closeout will cut down the cost of moving inventoried components and mill products. About 90 days prior to the move, it may be possible to divert most raw material shipments to the new facility. Production during the three-month period will reduce the inventory at the old plant. Food for thought: This may be the right time to standardize on purchases of mill products and components.

Leeds & Northrup Co., Philadelphia, began its master plan by having its plant engineering department make estimates of the costs

of moving certain standard types of machinery. Result: Estimators could take these figures and multiply them by the number of machines in the plant and come up with a guess on moving costs.

Explains Wilton D. Halstead Jr., section head, industrial engineering department, Leeds & Northrup: "Here is just one example of how preplanning paid off. Most of our machinery was working on a 220, 2-phase electrical system. The new plant was to have a 440, 3-phase system. Our plant maintenance crews converted all equipment (without affecting production) before the move."

Riggers Vs. Haulers—Both have their place. Warns one metalworking company which moved recently: "Make sure that the more expensive riggers are not doing haulers' work." Another area: Decide what your employees can do. "While we felt our employees were not qualified to move heavy equipment," reports H. K. Gessner, vice president-treasurer, Columbia Steel Equipment Co., Ft. Washington, Pa., "they did assist us in assembling workbenches and in making small tool setups."

Another Way—Leeds & Northrup used the conference method when it went looking for riggers and movers. It called in five of each, had a vice president provide a complete summary of what was needed. This saved telling the story ten times.

Problems Compounded—In large metalworking plants, the move may be a department type venture.

O. N. Dean, manufacturing manager, Exide Industrial Division, Electric Storage Battery Co., Philadelphia, cites this example: Exide had ten machines working one shift in a particular section. It decided to have five machines work two shifts so that no production would be lost while the other five units were moved.

When To Move—There is no set rule. It may come during a vacation shutdown, over week ends or at night. You can be assured it will go smoothly if pick and shovel planning is combined with a good communications program.

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GE Expands

Enlargement and modernization outlays since World War II total $1.4 billion

DESPITE TALK from some corporate heads about cutbacks in 1957, General Electric Co. is not slowing down its $500-million, three-year (1956-1958) expansion program.

With record sales of $4 billion in 1956, GE executives are optimistic about the company's future. Expectation: $8 billion yearly sales by 1964.

Record—Last year, GE spent $205 million on expansion of facilities, $34 million more than any previous year in the company's history.

Some of the expansion plans already on tap for 1957 shape up like this:

The Schenectady, N.Y., plant, largest and oldest in the company's system, will get $28 million for expansion and modernization.

At Lynn, Mass., GE's Medium Steam Turbine, Generator & Gear Department will start a $23-million, five-year expansion and modernizing program. Some $9 million will be spent this year.

Funds for expansion of the Small Steam Turbine Department in Fitchburg, Mass., have been increased $1.9 million; they now total $3.1 million.

Some $450,000 is being spent to modernize the company's Elmira Foundry, Elmira, N.Y.

GE's Aircraft Gas Turbine Division, Cincinnati, is building a special brazing facility for the fabrication of lightweight jet engine structures. Cost $150,000.

This month, GE announced completion of the $27-million expansion program which was started three years ago at its Direct Current Motor & Generator Department, Erie, Pa.

More Stainless

An expansion program of Universal-Cyclops Steel Corp., Bridgeville, Pa., has been started by taking options on a plant site near Coshocton, O.

If all the land can be obtained, the property will consist of about 500 acres on the Muskingum river.

William G. Stewart, president, describes the move as a part of a long term improvement and expansion program which will include the firm's plants at Bridgeville and Titusville, Pa.

At Coshocton — Mr. Stewart says: "A 30-in. wide stainless cold reduction mill with all the necessary auxiliary finishing facilities will be installed as the first step in the building of a new stainless plant at this site.

"This equipment is designed to produce wider strip than is now possible on our mills and is planned to supplement our operations at Bridgeville. It is imperative that we meet competitive conditions in our industry and expand our potential markets. We hope to have these new facilities in operation by Jan. 1, 1959."

The company expects to start construction in a few months.

Geographical limitations at Bridgeville caused the company to seek a new plant location. But the company emphasizes that it will maintain extensive operations and its general offices in Bridgeville.

Fansteel Adds Buildings

An estimated $665,500 will be spent on two expansion projects by Fansteel Metallurgical Corp., North Chicago, Ill.

A 21,500 sq-ft building is being added for the production of sintered powder metallurgy products. Expansion of a metallurgy building will include pilot plant facilities and laboratories.

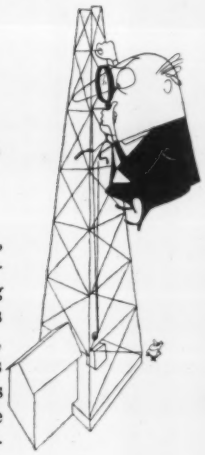
Completion of both projects is scheduled for Jan. 1, 1958.

Rockwell Starts Valve Plant

Valve Products Inc., a subsidiary of Rockwell Mfg. Co., Pittsburgh, has started construction of a 35,000 sq-ft building for the production of valve parts. The Knox, Ind., plant is expected to be completed during the first half of the year.

Hooker Expands in South

Nearly $1 million will be spent by Hooker Electrochemical Co., Niagara Falls, N.Y., to expand its Oldbury division plant at Columbus, Miss.



Senate Probers Check Oil, Not Autos, for Now

Sen. Joseph C. O'Mahoney (Dem., Wyo.) may have pulled the neatest trick of the year. By letting it be known that investigators were working the Detroit area, he has fanned the auto companies into exposing their defenses against charges that they're squeezing suppliers out of business (STEEL, Feb. 25, p. 67).

Facts: The Antitrust & Monopoly Subcommittee has plenty of work to handle in its current investigation of the oil industry. "No decision has been made to hold formal hearings on the auto manufacturers' relations with their suppliers. No one on the subcommittee could possibly forecast when such hearings might take place, if at all," comments a spokesman for the senator. But the spokesman adds (to further feed the Detroit fires): "We regard the situation as a staff problem—a piece of unfinished business."

So far, nothing has been heard in Small Business Administration circles about such an investigation. If Senator O'Mahoney does declare war, it's likely that he will seek background data there first.

In Other Areas: Little Action

That example of the sound-and-fury technique in Congress is as good a tip-off as any to what to expect from Washington this year: Plenty of noise, little action.

Out on a limb department: The federal budget won't be cut enough to matter. The school bill won't pass. Little will be done to help the housing industry. Chances for tax relief have probably already gone down the drain, although the Joint Committee on the Economic Report has recommended that Congress "should not defer tax revision until budgetary and economic conditions permit general tax reduction."

Take the Budget. The U.S. Chamber of Commerce specifically wants $780 million lopped off the $71.8 billion total. (Further cuts up to $5 billion may also be listed when the chamber finishes its study.) But where's the $780 million to come from? Says the chamber: $90 million from civil defense, $124 million from the Veterans' Administration, $184 million from the Housing & Home Finance Agency would help.

Comment: Those are prickly paths for any congressman to follow these days. Cut civil defense? Veterans' funds? Tsk, tsk.

School Bill Is Overshadowed

Everyone wants better schools. But action isn't likely if you account for the explosiveness of the segregation issue. An insider at one of the country's biggest construction associations isn't betting on it. And he just might know.

Housing Help May Never Come

Positive efforts are being made to help the housing industry. Federal Housing Administrator Albert M. Cole wants lower down payments on FHA insured loans. A House banking subcommittee started hearings last week on the proposal—and any others that come forward. The timing may be a little off, though. If housing starts take their normal uptrend this spring, Congress could easily lose interest.

SBA Loans Continue To Climb

Small Business Administration's semiannual report emphasizes the high level of business activity as the reason behind the rising rate of loans to small firms in the last half of 1956. The agency lent $70 million, compared with $52 million in the first half of the year. Set-asides of government purchases from small businesses jumped 79 per cent over those of the last half of 1955.

Bank Aids Chile

Export-Import Bank will loan $16 million to Cia. de Acero del Pacifico S.A. to expand its integrated steel plant at Huachipate, Chile. Among the proposed projects: A 200-ton open hearth and strip rolling and finishing equipment.

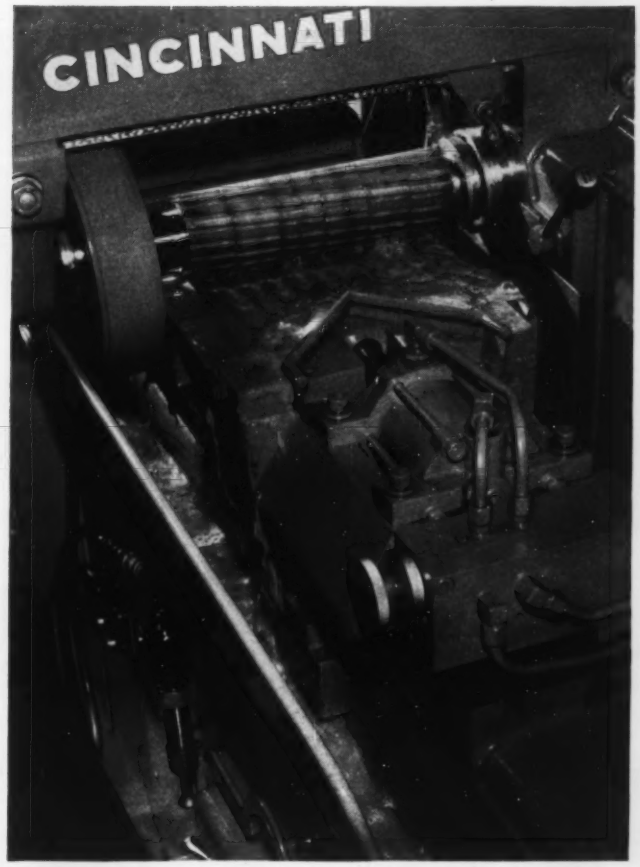
Meet Wallace E. Carroll:

He's on leave as president and treasurer of American Gage & Machine Co., Chicago, to be director of the Metalworking Equipment Division of the Business & Defense Services Administration for about six months. In Washington, he can be reached at STerling 3-9200.

POWERMATIC

Lives Up To Its Name

Takes 14½" Wide Cut in One Pass



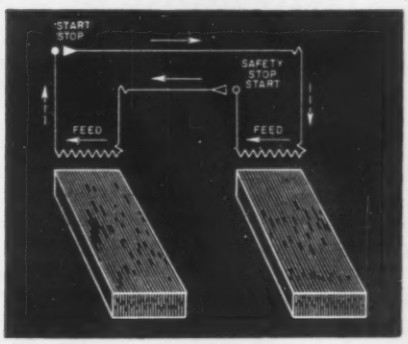
The Powermatic automatic cycle diagramed at the right combines high production with high quality to mill the teeth in 3700 hack saw blades per hour.

Combining a high percentage of usable power with automatic cycles is the specialty of Powermatic Milling Machines. The one illustrated here does the job to perfection for a prominent manufacturer of saw blades . . . **it takes a 10½" to 14½" wide cut in one pass, over two banks of parts, with automatic cycling of the table and spindle carrier.** ¶ This Powermatic is a plain automatic rise and fall style, 36" table traverse. Two hydraulic clamping fixtures with safety interlock, each holding 288 parts, are mounted on the table. The machine takes a "climb-milling" cut over both banks of parts, a distinct advantage in producing a uniform finish.

3700 saw blades are milled per hour at 87% operator efficiency

You will be interested in what makes this Powermatic setup a low-cost producer for similar work in your shop. Standard features include automatic backlash eliminator; automatic spindle stop; Dynapoise overarm; cycle selectors for automatic cycles. And Cincinnati engineering service is assurance of the most economical production of your components. Would you like to know more about CINCINNATI® Powermatic Milling Machines? You will find brief specifications in Sweet's. For complete data, write for catalog No. M-1913-1.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



CINCINNATI POWERMATIC
Plain Rise and Fall Milling Machine.
Catalog No. M-1913-1.

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J&L STEEL

Jones & Laughlin

... a great name in steel

Clark's Davies Makes Specials Come Easy

"OUR CUSTOMERS never want anything standard. It always seems like a special order," says 42-year-old Robert H. Davies, vice president, Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich.

Since any company that moves materials is a potential customer for Clark, Mr. Davies keeps busy devising ways of making special orders come easy.

"What we are trying to do is find answers to material handling problems for whole industries, average customers and for special needs," he explains. Clark's engineering staff reports most of the ideas and answers originate with Mr. Davies.

Solutions—About three years ago, he instituted Clark's Materials Handling Development Center. Officials from leading companies in an industry gather at the center for a two or three day seminar. They discuss handling problems common to their industry.

Clark engineers study seminar reports and suggest possible solutions at a later meeting. Recently completed is a study of the air transportation industry. In the works: A series of seminars on handling methods in the steel industry.

"The important thing we must always do is to bring in only industries with which we can be genuinely helpful," remarks Mr. Davies.

Specials—Clark's custom engineering department trouble shoots the needs of customers with special problems. One example is a lift truck with hollow, water cooled forks for moving hot slabs of steel.

Cost is a hot spot on specials, so Clark makes every effort to work around one of its 55 basic lift truck models. "At least this serves as a starting point," says Mr. Davies.

Average—Many of the special applications become standard items for Clark. It's estimated there are 2 billion different combinations of trucks and accessories which can be matched to fit customer needs.

Several years ago, Mr. Davies started to develop an improved lift truck. Late last year he announced the Clarklift line which combines many special items as standard equipment.

"The Clarklift should be the answer to most average needs," reports Mr. Davies. But even with such innovations as a single hydraulic lever for controlling all fork movements, self-adjusting brakes and improved automatic transmission, someone will always want something special.

Background—He graduated from the University of Minnesota in 1935 and spent his first working years in the rapidly growing aircraft industry.

During World War II, he was a trouble shooting superintendent for Henry J. Kaiser. He moved into material handling after the war and joined Clark in 1951.

Labor Glossary

CHANCES are that talk you've been hearing around the shop, in grievance committee meetings or in union-management conferences is neither Greek nor a new species of teen-age slang.

It's labor language, which had its origins for the most part in slang or jargon. But usage has made some of the terms accepted parts of the language. A knowledge of labor talk is handy if you're dealing in any way with labor relations. Here's a partial glossary.

Backtracking—Employee with more seniority taking job of one with less. (See bumping.)

Bait—A poor case kept in the procedure for trading purposes.

Banner—Carry a sign in a picket line.

Bindlestiff—Migratory worker.

Bogey—Limit on output informally maintained by employees.

Book—Labor contract.

Boondoggling—Useless unskilled labor.

Bootleg wages—Pay above prevailing labor rate.

Bumping—Employee with more seniority taking job of one with less. (See backtracking.)

Checkoff—Employer withholds pay from workers and pays it to the union.

Dead time—Time a worker loses from lack of materials or equipment breakdown.

Dollar unionism—Policy of low regular union dues.

Dough hound—Eager beaver who accepts any overtime rate.

Dualist—Union member whose views run counter to the official ideas in the union.

Featherbedding—Production limited, to force carrying excess manpower.

Fink—An individual who makes a career of working in plants where workers are on strike.

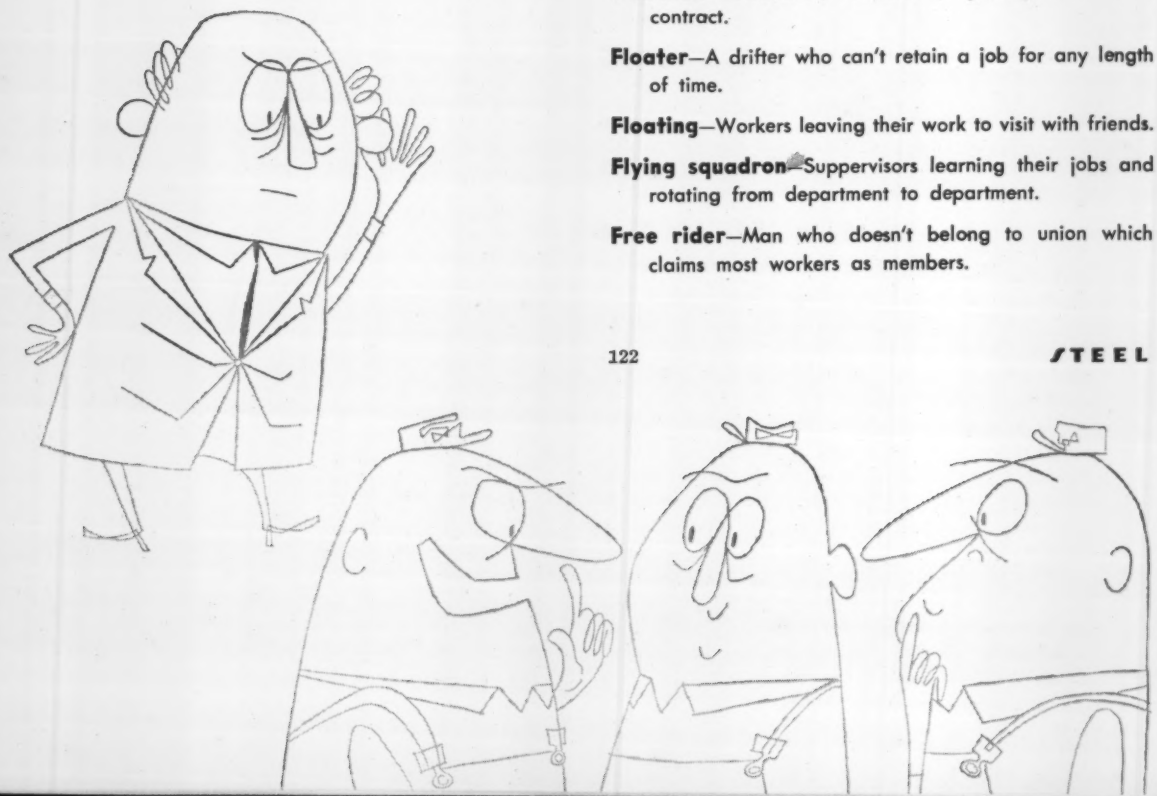
Fishhooks—Qualifiers, conditions, prerequisites in a contract.

Floater—A drifter who can't retain a job for any length of time.

Floating—Workers leaving their work to visit with friends.

Flying squadron—Suppervisors learning their jobs and rotating from department to department.

Free rider—Man who doesn't belong to union which claims most workers as members.



Goon—Person hired by a union or employer to incite violence during a strike.

Gravy job—One which pays more than others which require equal skills.

Having knee pads on—Appeal for mercy or equity when reliance on contract fails.

Hit the bricks—Go out on strike.

Invasion—Mass infiltration of union members into a non-union shop.

Knocked off—Discharged.

Labor skate—Salaried labor official of long tenure; an old hand in labor matters.

Lobster shift—Graveyard or late night shift.

Log-rolling—Settlement of grievances on the basis that since one side gave in on one question, the other side should give in on the next. It's a substitute for deciding each grievance on its own merits.

Missionary—An employer's agent in the union who warns members that a strike will fail.

Moonlighter—Worker holding two jobs at the same time.

Motherhood case—Union back pay claim for committeeman denied preferential overtime while on representation business. (Representation, like motherhood, is not to be attacked.)

Nobles—Armed guards hired to protect strikebreakers.

Pie card—Union membership card.

Pork chopper—Full-time union employee; usually means business agent or international representative.

Prying up loose boards—Attempt to take advantage of a loophole.

Rate buster—Worker who produces more than that informally agreed to by his associates.

Red circle rate—Individual rate of pay which remains at existing levels when the range is reduced below those levels.

Right-to-work laws—State laws which prohibit the union shop, closed shop and any other union security provision which requires an employee to join a union as a condition of retaining employment.

Rocking chair money—Back-pay claims by committeeman not offered overtime to which he was entitled.

Roving picket—Picket who follows struck employer's trucks.

Runaway rate—Incentive rate resulting in earnings out of proportion with earnings in jobs requiring similar skills.

Runaway shop—Business establishment that has changed location to escape from union conditions.

Scab—Employee who continues to work during a strike.

Scabwag—Defeatest employee who advocates going back to work, ending a strike.

Secondary strike—A strike against an employee to force him to cease using or selling products of a struck plant.

Shop chairman—Union steward who serves as chairman over all stewards in the plant. In a one-steward shop, it's used interchangeably with shop steward.

Shop committee—Group composed of representatives chosen by union members within a plant.

Shop lawyer—Union man who hunts loopholes in an agreement, usually a committeeman.

Show-up pay—Wages given to an employee under a contract when he is required to report to work and finds less than a certain number of hours of work available.

Soldiering—Deliberate reduction of output.

Split shift—Daily working hours that aren't continuous.

Steward—An employee elected by his fellows to represent them in dealing with the employer on grievances.

Stranger picketing—Picketing by persons who are not employees of the employer being struck.

Straw boss—Subforeman.

Superseniority—Special seniority rights granted to union representatives, veterans or other groups, giving them preferential treatment regardless of length of service.

Swing shift—A rotating shift.

Sympathetic strike—Strike of workers not directly concerned with the matter in dispute.

Threshold worker—Beginner.

Union security—A provision in a collective agreement assuring the union that some or all employees will be members of the union.

Union shop—A shop where employees must become union members and retain membership as a condition of continued employment.

Walking delegate—Local union business agent.

Walking the last mile—Union's appeal of a discharge case.

Wet time—Time lost due to bad weather.

Wildcat strike—An unauthorized walkout.

Working stiff—Ordinary wage earner.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

How Great Lakes Steel *teems* quality

You're up on the catwalk above the pouring platform along the open-hearth pit at Great Lakes Steel. Right below, one of the giant 250-ton teeming ladles is filling another train of hot-top ingot molds.

At no step in the production of good, deep-drawing steel is control of quality more important than in the teeming operation. For defects can easily develop *unless* the entire pouring operation is done exactly right . . . the way it is at Great Lakes.

For example, these hot-top molds are designed to eliminate shrinkage cavities in the finished product. A special lining compound of graphite or tar blankets the inside of every mold to form a highly protective shield for the delicate ingot surface.

And that's only a sample of the care Great Lakes takes *every step of the way* to maintain high and uniform quality steel!

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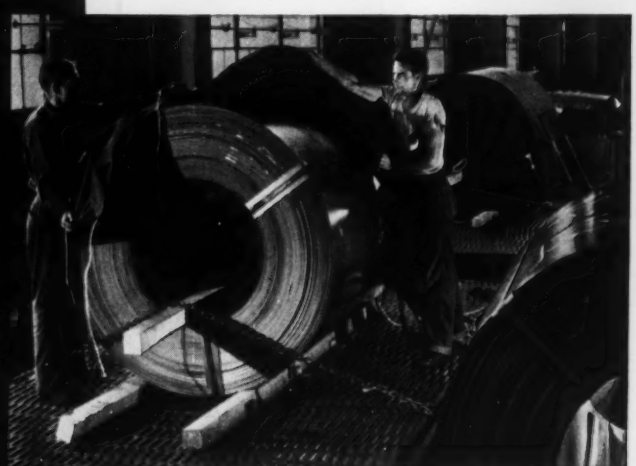

BUILT-IN QUALITY of Great Lakes steel is guarded through every step to final delivery. Here shipments of flat-rolled sheet coils are covered with tarpaulins for protection.

Auto Muffler Consumption

	Total Car Output (millions)	Single Muffler Systems (millions)	Dual Units* (% total car output)	Replacement Mufflers (millions)	Total Mufflers (millions)	Pounds of Steel** (millions)
1957	6.5	3.6	44	24	33.4	668
1956	5.8	3.3	42	20	28.3	566
1955	7.9	6.3	19	16	25.5	510
1954	5.5	5.2	6	12	18.0	360

Muffler figures estimated by STEEL.
*Factory installation only.
**Based on average of 20 lb per muffler.

Twin Pipes Boost Mufflers

Shorter life and desire for dual exhausts responsible for sales upswing. Peak is expected in 1958 as producers look for better materials to make mufflers last longer

MUFFLER manufacturers expect 1957 sales to climb to $133 million, a 16 per cent increase over 1956's.

These figures apply only to auto mufflers.

They cover replacement sales from independent and factory sources, plus original installations on new cars.

More Steel—A conservative estimate pegs steel consumption for '57 muffler output at 334,000 tons. Actually, more steel will be used because most dual exhausts have two mufflers, plus a couple of resonators to aid in silencing.

Buick, for example, has six mufflers in this year's dual layout. All medium priced cars have four or more.

Even single pipes are sporting two or three muffler-resonator combinations in tandem hookups. Probably less than 30 per cent of the 1957 cars will carry single mufflers.

Popularity — Most impetus for the muffler boom has come from the rapid growth of dual exhaust systems in the last three years (see percentage figures above). The urge for twin pipes originated with sports car fanciers who believe almost any factory built car is a contender for first prize in the NASCAR races.

Auto makers are quick to point out that dual units reduce exhaust back pressure, which makes for better engine performance and greater gas economy.

This is true, but a vice president of one of the leading muffler producing companies maintains: "I know of no factory muffler that by itself, in a single exhaust system, won't perform as well as any dual exhaust under present legal highway driving conditions."

And even though high speed performance may be better, dual exhausts lead to shorter muffler life.

Trouble—At low speeds and on short trips, one exhaust pipe is cut off. It won't heat up enough to quickly evaporate the acid concentrates formed from engine operation.

Result: Rapid internal corrosion which is a big headache for muffler makers.

A recent study by Sinclair Refining Co., New York, shows that muffler life expectancy has dropped from 22,000 to 15,000 miles in the last three years.

No Boon—This makes for high sales and irate car owners. Independent producers (they make about 98 per cent of all mufflers) and the auto companies keep looking for materials which will withstand corrosion and prolong muffler life.

Stainless steel and ceramic coated mufflers are being used successfully on trucks, but they're too expensive for automobiles. Rumors to the contrary, there are no plans to make stainless mufflers standard equipment on any of the '58 models.

Big Play—Aluminized and zinc coated steels are getting the biggest play this year. Chrysler has moved more toward aluminized mufflers. Ford seems to prefer zinc. General Motors' specifications call for both types.

The aluminized jobs give better corrosion resistance, but they are harder to form and cost more than zinc.

G. H. Hedrick, vice president in charge of sales engineering for Maremont Automotive Products Inc., Chicago, adds: "Personally, I've about reached the conclusion that it would work just as well to make mufflers from heavier gage rather than from coated steels." Costs would be lower.

Most mufflers use 20 or 22 gage steel for interior parts and 24 or 26 gage, double wrapped, for bodies.

Burn Out—Plastic mufflers were touted as a possible answer last year, but the firm which has been most active in plastic muffler research reports its last model won't hold up above 800°F. Muffler temperatures almost reach 1000°F

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during high speed operation.

Future—The present sales boom probably will slow down by 1958 as dual installations reach a plateau.

Some signs already are pointing in this direction. Ford has dropped the conventional dual exhaust system on its higher priced cars. It now runs an exhaust pipe from each manifold through a Y-shaped coupling and into one muffler. Results are just as good as those of the dual setup, says Ford.

Rear Engines Get Look

Three types of rear engine automobiles appear as likely bets in the opinion of Brooks Stevens, head of Brooks Stevens Associates, New York.

The industrial designer told the Society of Automotive Engineers in Detroit that a boulevard sports type, a functional family sedan and a utility car or station wagon are all candidates for rear engines.

Mr. Stevens said: "The seating position of tomorrow's rear engine car will be approximately the same as that of today's front engine car."

Retractable roofs, plastic bodies and a 180-hp engine on a 114-in. wheelbase may be characteristics of the rear engine automobile, Mr. Stevens remarked.

His comments add fuel to the small car fire that has been abuilding in Detroit.

George Romney, president of American Motors Corp., has long been convinced that there is a definite market for a small, compact, American-built car. Current Rambler sales (more than 15 per cent ahead of last year's) tend to bolster his predictions.

Other auto makers are not closing their minds to the possibility of smaller cars, particularly since the maker of Volkswagen is predicting 72,000 unit sales this year.

Chrysler Corp. has a two-man team working on small car designs. Other companies are hot on the trail.

Some sources have it that the rear-engine type may be ideally suited to this smaller car since the close relationship between engine, transmission and rear axle would make for sizable cost cuts in production.

Car Firms Report Earnings

Chrysler Corp. reports its 1956 net earnings totaled $19.95 million, compared with $100 million in 1955. Net sales dropped to $2.6 billion from $3.4 billion the year before.

The balance sheet shows net earnings were $2.29 per share, compared with $11.49 per share the previous year. Dividends dropped from $4 to $3 per share.

In 1955, Chrysler sold 1.5 million cars and trucks. Last year, sales slipped to a little over 1 million units.

The company has a determined program to pare administrative and service costs which were the big losers in 1956.

So far this year, Chrysler is taking slightly more than 20 per cent of the passenger car market in sales and production. This is better than a 5 per cent increase over 1956 marks.

Few model changes for 1958 will help keep Chrysler's tooling budget in line.

Earlier, General Motors Corp. stated that its 1956 net sales totaled $10.8 million, and net income was $847 million. Similar figures in 1955 were $12.4 billion and $1.2 billion.

Common stocks earned $3.02 per share last year, versus $4.30 per share the year before.

Total GM car and truck sales were 4 million units in '56 compared with 5 million in 1955.

This year, GM has about 45 per cent of the U.S. passenger car output, compared with 52.8 per cent in 1956.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,090	612,078
February		555,596
March		575,260
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Feb. 2	140,411	140,582
Feb. 9	147,163	136,308
Feb. 16	145,846	128,320
Feb. 23	138,938	125,537
Mar. 2	140,707†	132,889
Mar. 9	140,000*	132,840

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Gloom Greets GM Delay

The happy hustle that prevailed in Lordstown, O., has given place to gloom and disappointment. General Motors Corp. has again put off building a huge Chevrolet plant in this community near Youngstown.

GM is holding the 1100 acres it bought but has indicated that the plant will not be built this year at any rate, but says it has not abandoned its plans. The Pennsylvania Railroad holds 350 acres and Ohio Edison Co. 65. But the gloom is evident among private investors who bought up property for trailer parks, shopping centers and housing projects.

Much of this property is offered for resale at reduced prices.

Exhaust Notes

- Willys-Overland Export Corp., Toledo, O., will ship more than $30 million worth of Jeep vehicles and parts to Latin American countries during 1957.
- Lincoln says it has sold 5834 cars between Jan. 1 and Feb. 21, duplicating 1956 sales for the same period.
- Jaguar Cars Ltd., England, is back in limited production after a fire on Feb. 12 which destroyed 250 new cars and half of the assembly facilities. Over 200 were scheduled for the American market.
- Plymouth is adding a four-door sports sedan hardtop model to its 1957 line.
- Colorado has a law before its legislators which would require all automobile dealers, manufacturers and factory representatives to register with the state vehicle administrator. If passed, the bill would give the state strong control over dealer-factory relationships and all marketing practices. Auto firms likely would give up franchised dealerships.

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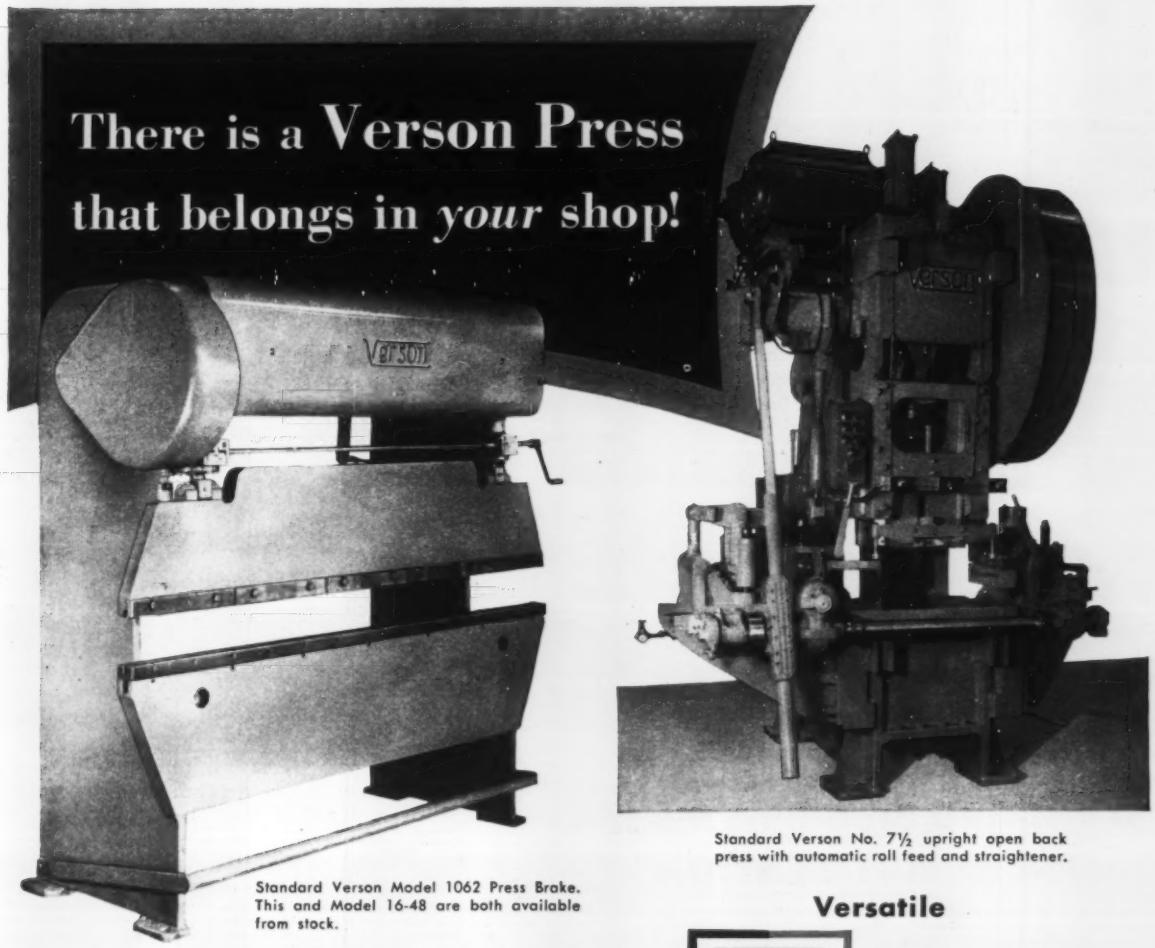

Standard Verson Model 1062 Press Brake. This and Model 16-48 are both available from stock.

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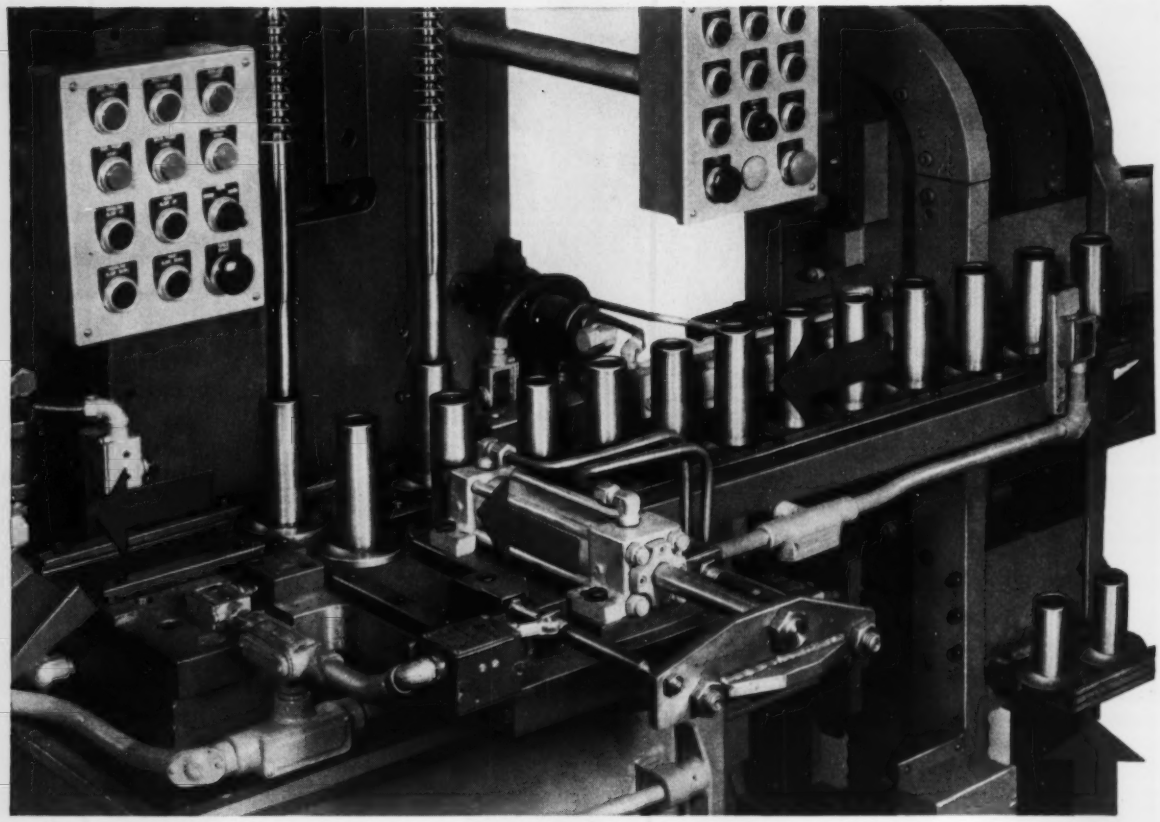

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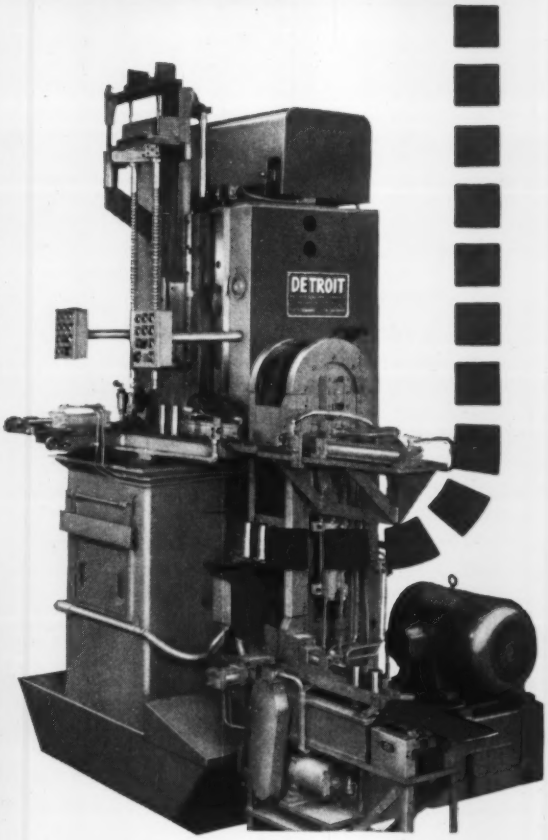
Write for bulletin describing Detroit Vertical Pull Down Machines.



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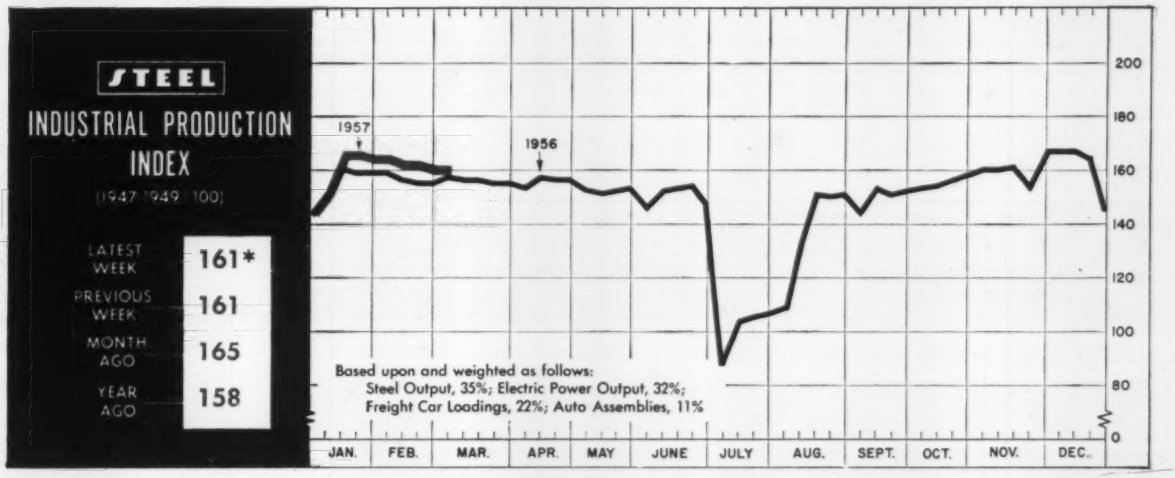

*Week ended Mar. 2.

Backlogs Put Backbone Into Economy

HIGH AND RISING backlogs of many metalworking companies indicate that production is going to be strong for some time to come. Durable goods industries have over four months' worth of unfinished business on the books at the current operating level. Add to this the continuing high level of incoming orders and you have a basically healthy economy.

Among companies reporting backlogs, about 80 per cent are saying that their Jan. 1 position was far better than it was a year earlier. And many point out that the uptrend is continuing into 1957. In some cases, the increase was 100 per cent. It is this momentum built up through two years of boom which is partially responsible for the high operating rate expected this year.

Both Barrels — But backlogs aren't enough. They would shrink quickly if new orders were to fall off drastically. But a leveling off, even a mild decline in ordering, would have little effect on production in many leading industries. As evidence, take a look at some representative industries.

Machine Tools: Monthly orders have fallen off nearly 43 per cent in the last year (see chart, page 130). Yet shipments increased steadily over the period. The industry started 1956 with an 8.4-month backlog. Since then it has been reduced by only a little over two months.

Industrial Furnaces: The backlog on Jan. 1 was at an all-time peacetime high of about $110.5 million even though new orders declined toward year end (see chart, page 130) while shipments increased.

Ferrous Castings: Of the three major groups (gray iron, malleable and steel) only steel showed a backlog decline in latest Department of Commerce figures. Even so, unfilled orders at steel foundries represent between three and four months of production at current rates. Gray iron and malleable foundries have about one month's backlog.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,429[1]	2,456	2,462
Electric Power Distributed (million kw-hr)	11,800[1]	11,920	11,199
Bituminous Coal Output (1000 tons)	9,845[1]	9,750	9,970
Petroleum Production (daily avg—1000 bbl)	7,575[1]	7,567	7,146
Construction Volume (*ENR*—millions)	$321.2	$374.7	$355.7
Auto, Truck Output, U. S., Canada (*Ward's*)	174,614[1]	169,083	167,422
TRADE			
Freight Car Loadings (1000 cars)	670[1]	627	711
Business Failures (Dun & Bradstreet)	300	317	230
Currency in Circulation (millions)[3]	$30,544	$30,605	$30,181
Dept. Store Sales (changes from year ago)[3]	+3%	+7%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,449	$25,663	$21,715
Federal Gross Debt (billions)	$276.2	$275.7	$280.0
Bond Volume, NYSE (millions)	$17.6	$13.5	$19.6
Stocks Sales, NYSE (thousands of shares)	8,259	6,961	14,177
Loans and Investments (billions)[4]	$85.1	$84.8	$84.1
U. S. Govt. Obligations Held (billions)[4]	$25.8	$25.7	$28.4
PRICES			
STEEL's Finished Steel Price Index[5]	227.10	227.10	225.92
STEEL's Nonferrous Metal Price Index[6]	239.1	239.3	276.9
All Commodities[7]	116.8	116.9	112.1
Commodities Other Than Farm & Foods[7]	125.4	125.4	120.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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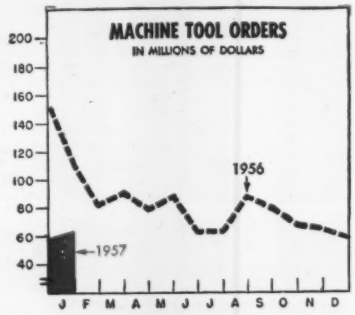
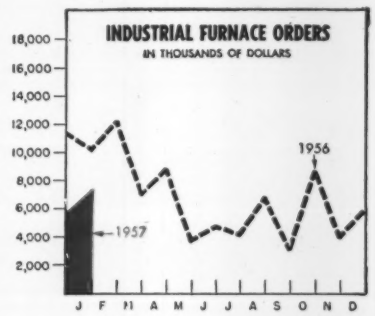
THE BUSINESS TREND





(Thousands of Dollars)

	New Orders 1957	New Orders 1956	Shipments 1957	Shipments 1956
Jan.	63,000*	109,550	76,600*	54,600
Feb.	.....	81,300	.....	64,600
Mar.	.....	89,500	.....	74,150
Apr.	.....	79,300	.....	71,800
May	.....	87,100	.....	76,800
June	.....	61,850	.....	76,250
July	.....	61,900	.....	65,150
Aug.	.....	87,500	.....	75,100
Sept.	.....	78,450	.....	71,100
Oct.	.....	66,100	.....	89,750
Nov.	.....	64,250	.....	81,700
Dec.	.....	57,200	.....	85,150
Totals	.....	924,000	.....	886,150

*Preliminary.
National Machine Tool Builders' Assn.

	1957	1956	1955
Jan.	7,380	10,244	4,973
Feb.	....	12,163	5,616
Mar.	....	7,025	7,345
Apr.	....	8,803	7,639
May	....	3,620	6,205
June	....	4,748	5,812
July	....	4,140	4,338
Aug.	....	6,722	6,273
Sept.	....	3,057	8,351
Oct.	....	8,741	9,575
Nov.	....	3,986	6,180
Dec.	....	5,858	11,105

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.

Charts copyright, 1957, STEEL.

Forgings: Steel forgers also have about three to four months' of unfinished business on hand. The ratio of shipments to backlogs has remained fairly constant for over a year.

Fabricated Structural Steel: Shipments are the highest in the industry's history; yet backlogs are climbing each month to a record level.

Freight Cars: New orders have declined steadily since the end of 1955 while shipments have shown strength. Yet the industry has managed to reduce its backlog only about 2500 cars a month. At this rate, it would take about 45 months to reduce it completely.

But you can't live off backlogs forever. It takes new orders to put life into any business. Reports coming in now show that 1957 is taking up where 1956 left off.

Gears: The American Gear Manufacturers Association reports that its new order index for January was 259.3 (1947-1949=100), a 10 per cent hike over December's.

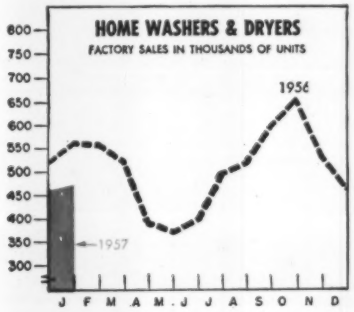
Industrial Supplies: The seasonally adjusted index of the American Supply & Machinery Manufacturers' Association reached the record level of 221 in January (July, 1948=100), up 3 points from December's reading.

The business picture is not so bright for all industries or even all companies within an industry. (The rate of business failures so far this year is even worse than last year's.) That is typical of the rolling adjustment which has characterized our economy almost continuously since the Korean War. But the economy as a whole is in a pretty good position to absorb any foreseeable dip in incoming business without falling apart at the seams.

Index Dips Seasonally

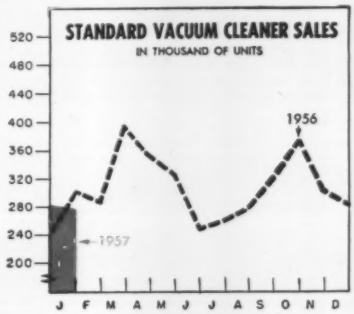
STEEL's industrial production index shows this to be true. When talk of an impending setback was at its loudest a month to six weeks ago, the index was at about 165 per cent of the 1947-1949 base period. During the week ended Mar. 2, it registered 161, a seasonal dip of only 4 points. It is still above the year-ago mark.

Two of the four components are in seasonal slumps—output of electric energy and freight car loadings. They cannot be expected to add strength to the index until



	Washers		Dryers	
	1957	1956	1957	1956
Jan.	331,314	393,717	144,621	166,243
Feb.	.....	405,631	.....	148,522
Mar.	.....	405,744	.....	113,031
Apr.	.....	324,238	.....	64,923
May	.....	315,249	.....	55,330
June	.....	340,235	.....	58,441
July	.....	380,172	.....	117,548
Aug.	.....	373,925	.....	144,537
Sept.	.....	402,631	.....	192,724
Oct.	.....	449,409	.....	206,929
Nov.	.....	357,935	.....	170,529
Dec.	.....	298,368	.....	162,953
Totals	.....	4,447,254	.....	1,601,710

American Home Laundry Mfrs. Assn.



	1957	1956	1955
Jan.	276,738	302,203	248,941
Feb.	.....	286,386	261,183
Mar.	.....	395,686	356,444
Apr.	.....	352,873	241,870
May	.....	326,008	255,941
June	.....	248,326	239,728
July	.....	259,774	206,758
Aug.	.....	276,932	252,691
Sept.	.....	320,278	306,507
Oct.	.....	371,998	349,654
Nov.	.....	300,381	307,267
Dec.	.....	281,025	243,457
Totals	.....	3,721,870	3,270,441

Vacuum Cleaners Mfrs.' Assn.

the springtime uptrend. The auto industry is expected to remain at the present level during the next three or four months, barring a collapse of spring selling.

The steel industry has eased off in the last two weeks. The American Iron & Steel Institute estimates the industry poured 2,429,000 net tons for ingots and castings during the week ended Mar. 10.

New Construction Report

F. W. Dodge Corp. reports that its first nationwide tabulation of construction contract awards shows January was ahead of the comparable year-ago period by 4 per cent. Previously based on the 37 eastern states, the survey now includes the 11 states west of the Rockies, where 23 per cent of January's contracts were let. The increase in this area was 13 per cent, compared with an advance of 1 per cent in the eastern states.

Contracts for nonresidential construction totaled $914,168,000, up 16 per cent from the January, 1956, mark. While residential contracts amounted to $816,566,000 (up 1 per cent), Dodge points out that the number of dwelling units involved declined by 9 per cent from the year-ago figure.

But, heavy construction awards (based on weekly compilations by *Engineering News-Record*) indicate that through the week ended Feb. 28, this year is 17 per cent below the corresponding period of last year. In view of such conflicting reports, it probably will be another two months before a definite trend for 1957 takes shape in the construction industry.

Appliances: Mixed Trends

Amid reports of cutbacks in the production of home appliances, the American Home Laundry Manufacturers' Association reports that factory sales of home laundry equipment in January were 7 per cent above December's (see chart above). Washer-dryers and washers were up, while dryers and ironers were down.

In smaller appliances, factory sales of vacuum cleaners decreased in January for the third consecutive month (see chart above). Even at that, it was the second best January in the industry's history, says the Vacuum Cleaner Manufacturers' Association.

SIMONDS
INDUSTRIAL CUT GEARS
LARGE OR SMALL
HEAT TREATED OR PLAIN

SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

Custom
GEAR CUTTING

SIMONDS' facilities can produce any type of custom gear from your blanks if you prefer. Same quality . . . same prompt service.

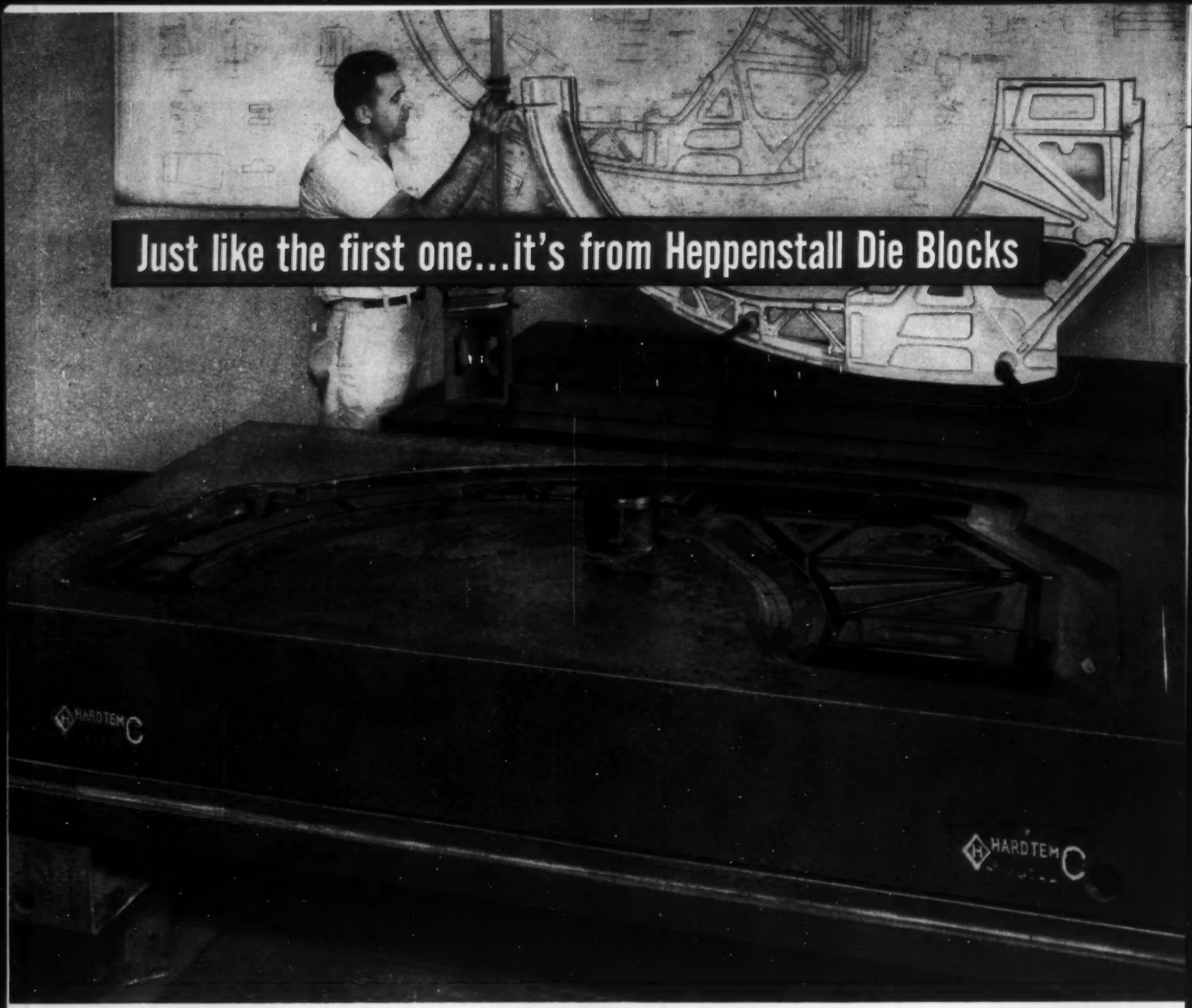
QUALITY GEARS FOR OVER 60 YEARS

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS WORM GEARS
RACKS PINIONS

Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

SIMONDS GEARS

THE SIMONDS GEAR & MFG. CO.
LIBERTY at 25TH PITTSBURGH 22, PA.



You get precision forgings... economical sinking with Heppenstall

Holding dimensions is one of the big plusses you get with Heppenstall Hardtem Die Blocks. A case in point is the production of these half-bulkheads for jet fighters at the Air Force Heavy Press Plant, Cleveland, Ohio, operated by Aluminum Company of America. Hardtem "C" Blocks are turning out these high strength aluminum alloy forgings to close tolerance specifications . . . and holding dimensions in forging after forging.

Machinability of Heppenstall Hardtem rates high, too. That's why so many tough designs are laid out on Hardtem Blocks. Veteran Die Sinkers know they can expect savings in cutting time, longer tool life, and more accurate sinkings from Heppenstall Die Blocks.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide range of hardnesses to match varying customer requirements of application and machinability. If you're looking for better die block machinability and service life, contact your Heppenstall Representative. He can quickly get the one best answer for you.

These five Heppenstall Warehouses carry stocks of the most popular size die blocks:

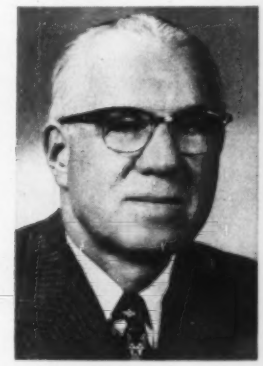
Bridgeport 5, Conn. • Detroit 32, Mich. • Indianapolis 27, Ind. • Los Angeles 22, Calif. • Pittsburgh 1, Pa.

HEPPENSTALL

... the most dependable name in die blocks

PITTSBURGH 1, PENNSYLVANIA

OSCAR L. JOSEPH
Associated Spring post



HAROLD M. CHERRY
heads George Nankervis Co.

FREDERICK J. O'REILLY
National Electric Products post

STEWART G. FLETCHER
Latrobe v. p.-metallurgy

Oscar L. Joseph was named plant manager at Ann Arbor, Mich., for **Barnes - Gibson - Raymond Division of Associated Spring Corp.**, Bristol, Conn. He was purchasing agent at the Plymouth plant. He succeeds **Melvin E. Donally**, retired. **H. Perry Smith** joined Associated Spring as assistant director of research. **Norman Gardner** succeeds Mr. Joseph as purchasing agent of Barnes-Gibson-Raymond Division.

George L. Nankervis Co., Detroit, elected **Harold M. Cherry** president to succeed the late **George L. Nankervis.** Mr. Cherry was senior vice president. **Claude E. Cox, Henry W. Grikscheit, Vernon G. Converse** and **Stanley R. Andersen** were elected to the executive committee.

Hooker Electrochemical Co. appointed **William L. Gillespie** manager, sales administration. He was Chicago district sales manager and moves from LaGrange, Ill., to Niagara Falls, N. Y. **John T. Walmsley** replaces Mr. Gillespie.

William A. Nairne was made manager of buff sales for **Hanson-Van Winkle-Munning Co.** He is at the firm's midwest plant, Grand Rapids, Mich.

Paul B. Hoffman was made manager, purchasing administration department, in **Ford Motor Co.**'s central purchasing office, Dearborn, Mich.

George R. Cook was made general director of purchasing at **Fisher Body Division**, General Motors Corp., Detroit.

Frederick J. O'Reilly fills the new post of general manager of manufacturing for **National Electric Products Corp.**, Pittsburgh. He was works manager at the Elizabeth, N. J., plant.

Edward S. Maury and **Harry A. Donahue Jr.** were elected vice presidents of **Marion Electrical Instrument Co.**, Manchester, N. H. Mr. Maury, former general sales manager, heads the new instrument division. Mr. Donahue, former aviation sales manager, now is in charge of the aviation division.

International Resistance Co. appointed **Robert L. Colfax** sales manager, Hycor Division, Sylmar, Calif.; **Otho C. Lindsey**, sales manager, Circuit Instruments Inc., a subsidiary in St. Petersburg, Fla.

Allyne-Ryan Foundry Co., Cleveland, elected **Frank L. Feltes** president and chairman; **Gabriel R. Friedl**, secretary and treasurer; **Neath W. Wilson**, assistant secretary.

Patrick N. Morgan was named assistant to the president and general sales manager, heater and tank division, **John Wood Co.**, Conshohocken, Pa. He was sales manager for heating and air conditioning products at Combustion Engineering Inc.

Paul E. Busby was made director of research for **Heppenstall Co.**, Pittsburgh, to succeed **Dr. R. B. Corbett** who transferred to the Midvale-Heppenstall Co.

Stewart G. Fletcher was elected vice president-metallurgy at **Latrobe Steel Co.**, Latrobe, Pa. He was director of metallurgy.

Copperweld Steel Co., Warren, O., appointed **Robert P. Morgan** superintendent of its 12 and 18-in. C mills and the 21 and 24-in. B mills. **William Bowker Jr.** was made assistant superintendent of the blooming and billet mills.

John F. Torley, assistant plant superintendent at the Sharon, Pa., plant of **National Malleable & Steel Castings Co.**, was made general superintendent of the Capitol Foundry Division, Phoenix, Ariz.

Leland S. Hanson was made executive sales director, **Chase Brass & Copper Co.**, Waterbury, Conn. He is succeeded as eastern regional sales manager by **Charles A. Festge. Edward J. Finn** succeeds Mr. Festge as district manager at Milwaukee.

Victor G. Pike was made purchasing director, **New Process Gear Corp.**, Syracuse, N. Y. He succeeds **Charles L. Pierson**, resigned.

Crowningshield Inc., Greenfield, Mass., elected **Francis J. Sweeney** president.

Emhart Mfg. Co., Hartford, Conn., elected **Robert J. Decker** vice president-treasurer.

William H. Reeves was named president of **Layne & Bowler Inc.**, Memphis, Tenn., to succeed **James I. Seay**, now chairman. **Frank T.**

WILLIAM J. DIEHL

HARRY HOLIDAY JR.

Armco Steel management appointments

DR. WILLIAM A. REED

LEONARD R. STONE

Republic's nuclear research posts

Quinn was named vice president-manufacturing; **A. O. Fabrin**, vice president-engineering.

At **Armco Steel Corp.'s** Middletown, O., works, **William J. Diehl** was promoted to superintendent of the coke plant and transportation and labor departments, Hamilton plant. **Harry Holiday Jr.** was appointed manager of the blast furnace department. **Russell Martin** was made superintendent of the assigned maintenance department; **James E. Baltzell**, superintendent of the maintenance shops department.

Arthur W. Neel, vice president of **McCormick Bros. Corp.**, Albany, Ind., will retire Apr. 1. He will remain a director and serve as a consultant.

George Herrick was made Detroit sales manager, **Clearing Machine Corp.**, division of U.S. Industries Inc.

Allied Products Corp. appointed **Theodore R. Pleines** general manager of Plant 1, Detroit; Vice President **Leo F. Brown**, general manager of plant 3, Hillsdale, Mich.

Edwin L. Horsley was made New York district manager, **Rome Mfg. Co.**, division of Revere Copper & Brass Inc.

Chicago Steel Tank Co., division of U.S. Industries Inc., Chicago, appointed **B. E. Elson** staff assistant to the general manager.

Charles H. Schminke was made assistant sales manager; **David M. Humphrey**, sales office supervisor for the building products division of **American Welding & Mfg. Co.**, Warren, O. Mr. Schminke was field sales manager for Ramset Fasteners Inc. Mr. Humphrey was general manager, Warren Septic Tank Co.

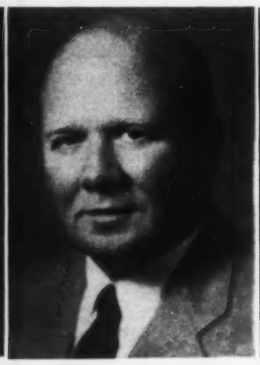
Lamson & Sessions Co., Cleveland, promoted **John R. McDonald** from assistant manager to manager, small screw sales. **Robert G. Patterson Jr.** was made manager, distributor sales.

Ardon B. Judd was elected president, **Southwest Fabricating & Welding Co.**, Houston, a subsidiary of Walworth Co. **Fred W. Belz**, president of Walworth, becomes chairman of Southwest.

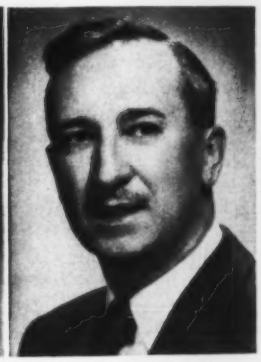
Dr. William A. Reed, process engineering head of **Republic Steel Corp.'s** research laboratory and former director of Massachusetts Institute of Technology's engineering school at Oak Ridge, Tenn., was named to direct Republic's study of applications of nuclear energy in the steel industry. **Leonard R. Stone** will head the nucleonics department, which will put special emphasis on isotope research in steel processes. **Dr. Robert P. Petersen** resigned as director of nuclear research to become president of Applied Research Inc.

D. S. Harder was appointed executive vice president, **Ford Motor Co.**, Dearborn, Mich. In addition to present responsibilities over

KENNETH ODE



WARREN MacFARLANE JR.



CHARLES WHITNEY

Midland Steel Products appointments

Midland Steel Products Co., Cleveland, appointed **Kenneth Ode** vice president and general manager, Cleveland Division; **Warren MacFarlane Jr.**, vice president and general manager, Detroit Division; **Charles Whitney**, division manager at Detroit. Mr. Ode was general manager, special products division, White Motor Co. Mr. MacFarlane was vice president-manufacturing, Minneapolis-Moline Co. Mr. Whitney was manager, frame and cold heading plant, Ford Motor Co.

Another **STANLEY STEEL STRAPPLICATION*** on the job

Making 3 times 16 equal ONE

3 tiers of cylinder head forgings, 16 forgings to a tier, make a sum total of 48. But secured to a pallet by the Stanley "Uni-Tie" Method, all 48 become ONE compact package, easier for this Cleveland manufacturer to handle, store and ship. Using the Stanley Electric Skid Magazine Power Tool, every strap is effortlessly and speedily pulled up to the same pre-determined tension, so there's no danger of the strapping loosening or the load shifting.

Perhaps teaming up the Stanley "Uni-Tie" Method with the Stanley ESM Tool is the way for **you** to save time, space, man-power or eliminate costly containers. But whatever your packaging or shipping problem, Stanley has ways to solve it. **WRITE FOR YOUR FREE COPY** of the "Stanley Strapplication Manual of Packaging and Shipping" to **STANLEY STEEL STRAPPING,** Division of The Stanley Works, Dept. C, 1476 Lake Street, New Britain, Conn.

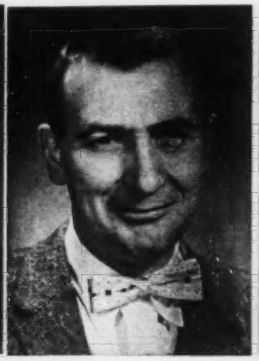
INSURE IT-SECURE IT-WITH STANLEY STEEL STRAPPING

STANLEY

**The system-atic way to solve specific packaging and shipping problems*

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS • STANLEY STEEL STRAPPING • STANLEY STEEL

DAN R. SCOTT
Motch & Merryweather



WALTER J. THORNE
Burroughs purchasing agent

CHARLES L. ZOLTANI
Teller div.-chief eng.

L. C. COLLERAN
Roll Formed sales mgr.

E. J. REITLER
Firth-Loach sales mgr.

CHARLES D. COXE
Handy & Harman post

basic manufacturing divisions, he will be in charge of car, truck and tractor divisions.

Roll Formed Products Co., Youngstown, appointed **L. C. Colleran** sales manager; **W. P. Cooper Jr.,** assistant sales manager.

E. J. Reitler was appointed sales manager of **Firth-Loach Metals Inc.,** McKeesport, Pa. He was assistant sales manager.

Walter J. Mollenauer and **William P. Youngquist** were appointed assistant sales managers, **Vulcan Crucible Steel Division,** Aliquippa, Pa., H. K. Porter Company Inc.

Douglas W. Vernon was named product sales manager, wire rope and air cord, at **John A. Roebling's Sons Corp.,** Trenton, N. J.

Arthur A. Treible was made sales manager of **Fitzsimmons & Co.,** Cleveland.

J. C. Drader, vice president, **Michigan Tool Co.,** Detroit, fills the new post of vice president-research.

Charles D. Coxe was made manager, metallurgical department, **Handy & Harman,** New York. He was assistant manager of the department.

Alan G. Ingraham was made manager, alloy sales, **United States Steel Supply Division,** Chicago, U.S. Steel Corp.

Clee O. Worden joined **Edgcomb Steel Co.,** Philadelphia, as manager of tool steel sales.

Edward Gerstenschlager was appointed manager of production engineering at **Babcock & Wilcox Co.'s** boiler division at Barberton, O.

Thomas A. Jones was named vice president-general manager, **Manchester Machine Co.,** Middletown, O. He was division manager in Chicago for Jones Division, Hewitt-Robins Inc.

Stephen Sanders was made regional sales manager of **Rolled Steel Corp.,** Skokie, Ill. He covers six states, including Wisconsin.

Dan R. Scott was named sales manager, Allied Products Division, **Motch & Merryweather Machinery Co.,** Cleveland. He was assistant sales manager.

Walter J. Thorne was named manager of purchases for the recently formed Detroit Mfg. & Engineering Division, Burroughs Division, **Burroughs Corp.** He was manager of purchases at Control Instrument Co., Brooklyn, N. Y., a Burroughs subsidiary.

Teller Co., Butler, Pa., appointed **Charles L. Zoltani** chief engineer for its special machinery division. He was project engineer for H. H. Robertson Co.

John F. Connelly was elected chairman, **Crown Cork & Seal Co. Inc.,** Baltimore. He succeeds **John J. Nagle** who was elected chairman of the newly formed finance committee.

J. H. Richard was made assistant manager, general order department, **Republic Steel Corp.,** Cleveland. He was manager, flat-rolled division of the order department.

Henry S. Maday was elected executive vice president, **Maday Body & Equipment Corp.,** Buffalo.

OBITUARIES...

Albert T. Morris, 74, retired operations manager, **American Chain & Cable Co.** in York, Pa., died Feb. 21.

William B. Frey, 77, former president and sales manager, **American Floor Surfacing Machine Co.,** Toledo, O., died Feb. 22.

Elmer C. Birchfield, founder of **Birchfield Boiler Co.,** Tacoma, Wash., died Feb. 15.

Lewis F. Hart, former president, **Hart Mfg. Co.,** Cleveland, died Feb. 25.

Reuben J. Russell, 81, vice president and a founder of **Century Electric Co.,** St. Louis, died Feb. 11.

Robert G. Smith, 71, founder and president, **R. G. Smith Tool & Mfg. Co.,** Newark, N. J., died Feb. 19.

Harold D. Skyrm, 59, vice president, **General American Transportation Corp.,** Chicago, died Feb. 24.

You can't beat experience

...and BOHN has over 40 years experience producing

castings, forgings and extrusions

Knowledge of production problems can make a big difference in cutting costs and assuring higher quality for your product.

Knowledge comes from experience—and Bohn has over 40 years in fabricating aluminum and brass.

Let Bohn's experience help on *your* production problems.

Contact your nearest Bohn sales office today!

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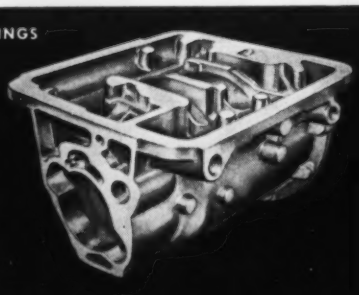
ALUMINUM AND BRASS CORPORATION

DETROIT 26, MICHIGAN

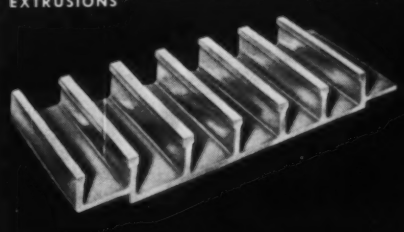
CASTINGS • FORGINGS • EXTRUSIONS • PISTONS • BEARINGS • BRASS ROD • BRASS AND BRONZE INGOTS • REFRIGERATION AND AIR CONDITIONING PRODUCTS

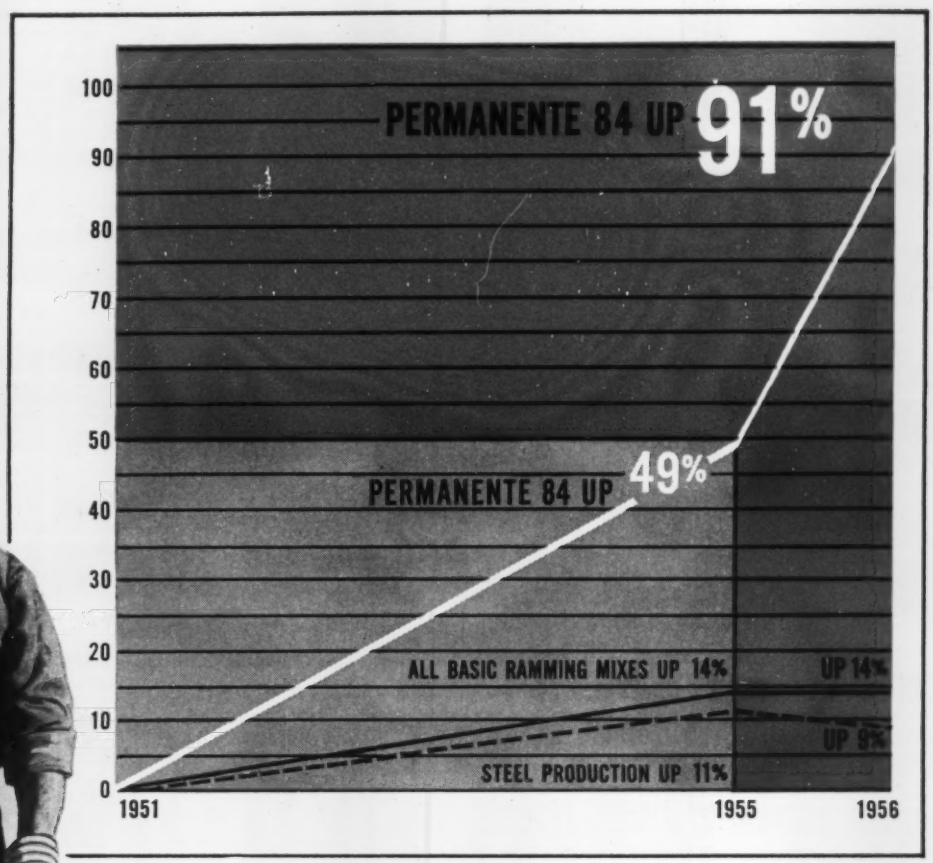
CASTINGS



FORGINGS

EXTRUSIONS





Why this ~~growing~~ *soaring* preference for Permanente 84 Ramming Mix?

A year ago, we ran an ad showing how sales of Permanente 84 to steel producers had increased 49% during the same 5-year period that sales of all basic ramming mixes increased only 14%.

But now after just one more year, steel producers' preference for Permanente 84 has pushed its sales increase up to *a whopping 91%!*

Why such an overwhelming preference? Briefly, here are the reasons:

Permanente 84 reduces the cost of maintaining furnace bottoms and banks. Repairs made with Permanente 84 stay put! Down time for hot repairs is reduced. Steel production goes up—costs come down. Ideal for hot patching both open hearths and electric furnace banks and bottoms.

Order Permanente 84 now and get extra steel tonnage at lower cost.

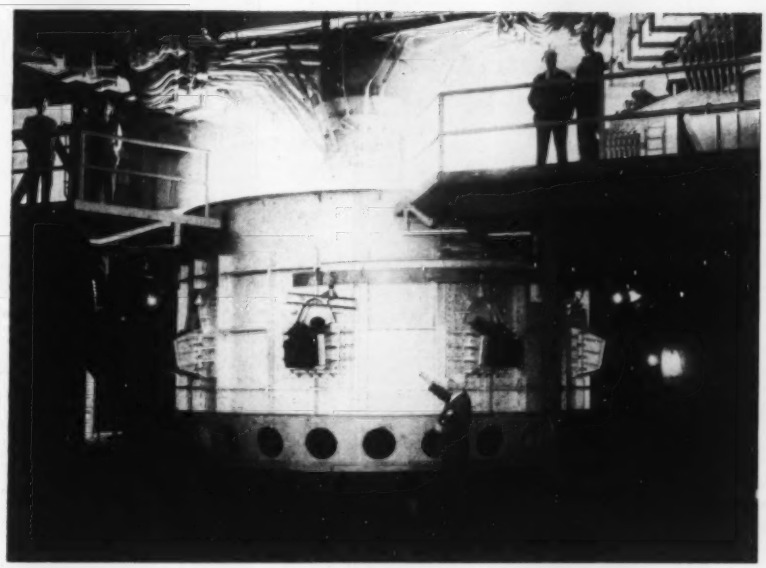
Call or write Kaiser Chemicals Division, Dept. R7241, Kaiser Aluminum & Chemical Sales, Inc., at any of the addresses listed below:
PITTSBURGH 22, PA. . . . 3 Gateway Center
HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

CHEMICALS KAISER REFRACTORIES

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials • Castables & Mortars • Magnesite • Periclase • Deadburned Dolomite



Pittsburgh Metallurgical's huge furnace at Calvert City . . .

Boosts Ferroalloy Output

PRODUCTIVE capacity of Pittsburgh Metallurgical Co. Inc.'s ferroalloys plant at Calvert City, Ky., has been increased 25 per cent. The 21,300-kva furnace (pictured above) was placed in operation late last month.

Company officials say it is the world's largest furnace for the production of ferroalloys. (Notice how it dwarfs Charles F. Colbert Jr., chairman and president of the firm, who is in the foreground.)

The furnace is of the submerged arc rotating hearth type. Including attendant equipment, it cost more than $1.5 million.

Economies Seen — The furnace uses about 300 tons of raw materials daily. It more than doubles the productive capacity of the next largest of ten other electric furnaces operating around the clock at the Calvert City plant. The installation is expected to bring about substantial operating economies.

Mr. Colbert estimates that net sales for the fiscal year ending June 30 will exceed $42 million, compared with $40 million for the previous like period. In the first seven months of the current period, sales rose 10.18 per cent.

Pittsburgh Metallurgical Co.'s executive offices are in Niagara Falls, N. Y. Plants are in that city, Calvert City and Charleston, S. C.

Ryerson Enlarges Facilities

Joseph T. Ryerson & Son Inc., warehousing subsidiary of Inland Steel Co., Chicago, has leased the Jasper Blackburn Corp. property on First street, St. Louis. A 36,000 sq-ft addition will enlarge the present 31,200 sq-ft structure. The present Blackburn building will be used for warehousing Reynolds aluminum in coil, sheet, plate, rod and bar form. It marks Ryerson's entry into the aluminum field in the St. Louis area. The new spans will be used for the company's Sheet & Strip Steel Division. A 52-in. slitter line, a 52-in. cut-to-length line and additional shearing capacity will be installed.

Space released in the present Ryerson plant when the Sheet & Strip Steel Division is moved across the street to the Blackburn property will be utilized for expanded stocks of bars, plates and structurals.

The project will increase Ryerson's St. Louis capacity about 42 per cent.

Shell Process Inc. Moves

Shell Process Inc., manufacturer of shell molding machines and allied equipment, moved into larger quarters at West Springfield, Mass.

Allied-Kennecott Titanium Corp.

Kennecott Copper Corp. and Allied Chemical & Dye Corp., New York, have joined to form the Allied-Kennecott Titanium Corp. It will produce and sell titanium. Initial investment: $40 million. Several locations are under consideration, and operations are expected to begin in 1958. The planned product mix will include titanium chloride, sponge and billets.

Buffalo Forge Buys Plant

Buffalo Forge Co. purchased a plant at 490 Broadway, Buffalo. It contains 30,000 sq ft of manufacturing space, plus additional storage space. The property will be used for light manufacturing and the assembly of machine tools, blowers and air conditioning equipment.

Firth Sterling Opens Warehouse

Firth Sterling Inc., Pittsburgh, manufacturer of tool and die steel, sintered carbides, high temperature alloys and zirconium, opened a warehouse at 2900 S. Vail Ave., Los Angeles, Calif.

Armco Drainage To Build Plant

Armco Drainage & Metal Products Inc., Middletown, O., will build a $400,000 manufacturing plant at Wellington, O. The company is a subsidiary of Armco Steel Corp. and produces prefabricated steel buildings and a wide variety of other steel products used in the construction industry and on the farm. The new plant will make corrugated metal pipe and pipe arches, paved pipe and pipe arch,

(*Please turn to page* 143)

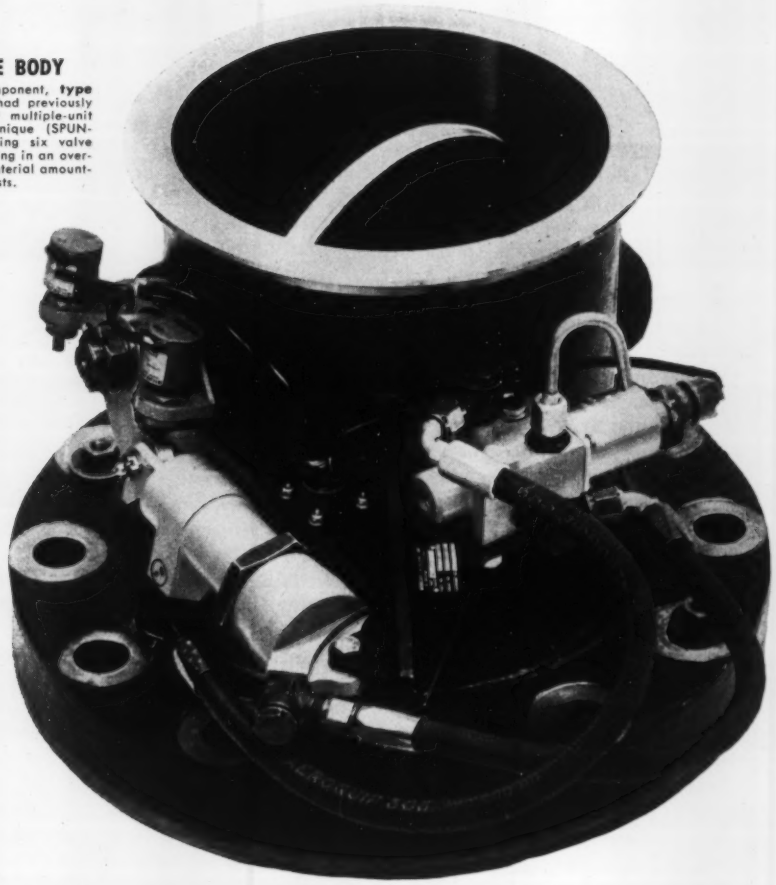
VALVE LINKAGE LEVERS

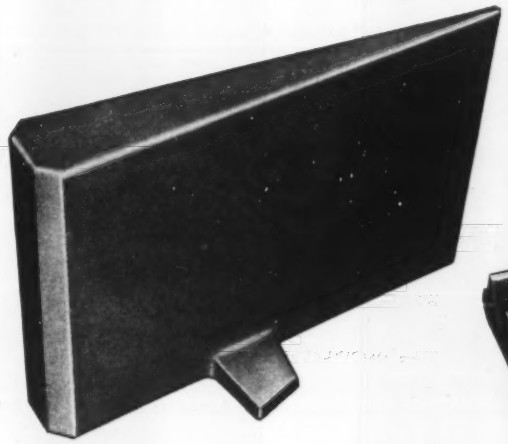
Small parts are no problem. These ESCO SHELLCAST corrosion resistant alloy steel **type 317, A296-49T, CF-8M,** valve linkage levers weigh less than two ounces each.

Before you say, "It can't be cast,"

BUTTERFLY VALVE BODY

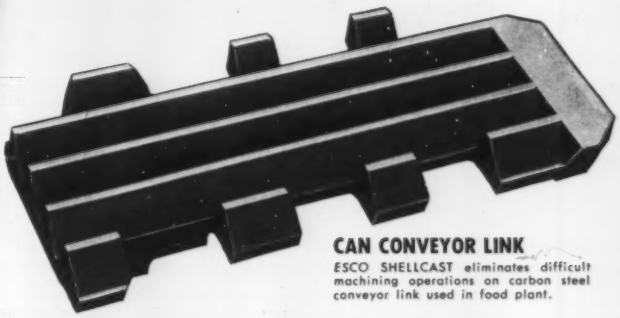
This guided missile component, **type 304, A296-49T CF-8,** had previously been fabricated. ESCO multiple-unit centrifugal casting technique (SPUN-CAST®) was used, casting six valve bodies at one time resulting in an overall saving in time and material amounting to 30% of former costs.





HEAT-TREATING VANE TIP

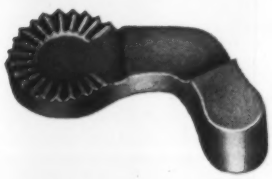
ESCO SHELLCAST in a heat resistant weldable alloy, **type 302B, A297-49T HF,** eliminated all former machining.



CAN CONVEYOR LINK

ESCO SHELLCAST eliminates difficult machining operations on carbon steel conveyor link used in food plant.

call an *ESCO* Engineer...



ESCO alloy steel castings can make your designing *easier*. You get the part you want, in the alloy you need and in the shape that saves you the most fabricating, machining and finishing time . . . ***PLUS***

METALLURGICAL ENGINEERING AND RESEARCH

ESCO maintains one of the largest and best equipped metallurgical staffs of any alloy steel foundry . . . ***PLUS***

PRODUCT ENGINEERING AND DESIGN

An integrated service at all levels; in the field, at the drawing board and in the foundry . . . ***PLUS***

FOUNDRY FACILITIES AND CASTING EXPERIENCE

A casting service that covers the complete range of alloy steel casting methods for all applications . . . ***PLUS***

LABORATORY INSPECTION AND TESTING

ESCO laboratory technicians are qualified and equipped to perform all types of inspections and testing to the most rigid specifications.

Write today for your FREE copy of this informative 100-page reference book—"ESCO Alloy and Stainless Steels for the Process and Manufacturing Industries".

Call an ESCO Engineer — let him show you how ESCO Alloy Steel Castings can help make your designing easier.

ELECTRIC STEEL FOUNDRY COMPANY

Manufacturing Plants
2160 N.W. 25th Ave.
Portland 10, Oregon
1017 Griggs Street
Danville, Illinois

ESCO International and Eastern Sales:
420 Lexington Ave.,
New York City, N.Y.

Other Offices and Warehouses
Los Angeles, San Francisco, Calif.; Seattle, Spokane, Wash., Salt Lake City, Utah; Denver, Colo.; Houston, Texas; Eugene, Ore.; Centralia, Pa.; Honolulu, Hawaii.

In Canada, ESCO Ltd. Manufacturing Plants
Vancouver, British Columbia; Toronto, Ontario and Montreal, Quebec

Lapointe Machine Tool Company, Hudson, Massachusetts

FIRST OF ITS KIND IN THE WORLD!

. . . And It's Lubricated by Cities Service Pacemaker 400 T Oil!

LAPOINTE MACHINE TOOL COMPANY, originator of the broaching method of cutting metal over 50 years ago, has now originated the first vertical broaching machine with variable speed electro-mechanical drive.

Purpose of the huge, gear-driven machine is to increase tool life up to 500% through smoother operation, thus saving down time and producing more accurate work.

Selection of a lubricant for the new machine was of special importance because of the tremendous pressures it develops: normally 30,000 pounds, sometimes up to 60,000 pounds. Of the many brands of lubricants Lapointe tested, Cities Service Pacemaker 400 T had the necessary requirements for the job . . . so naturally, this superior lubricant got the job.

"We test the machines with Pacemaker 400 T at the factory and then put it in again when the broaches are assembled at the buyer's plant," says Lapointe. "It offers all the characteristics we need: Good film strength, high viscosity index, and exceptional anti-foam and anti-oxidant qualities. Needless to say, we're pleased and impressed with this Cities Service lubricant."

Like scores of others, Lapointe has discovered the search for a proper lubricant ends at the Cities Service label. Altogether, there are hundreds of Cities Service products for the exacting needs of industry. For more information, talk with your nearby Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Quick Facts About New Broaching Machine

USES: Now used for broaching aircraft engine turbine buckets, but can be adapted to general broaching.

ADVANTAGES: Increases tool life 400-500% through smoother operation, less down time. Produces more accurate work. Variable cutting speed: 12 to 75 FPM. Available in single or double ram models with 72" to 100" stroke.

Quick Facts About Pacemaker 400 T Oil

USES: Propulsion turbine units where oil is circulated under heavy pressure. Widely used in naval and commercial vessels, high speed industrial machinery.

ADVANTAGES: High viscosity index, excellent heat resistance and film strength. Chemically fortified against oxidation, rust, and foaming.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

(*Concluded from page* 139)

large diameter sewer pipe and pipe fittings. It will also serve as a warehouse for stocks of pipe, highway guard rail and sheet piling which are manufactured in other Armco Drainage plants.

Tubesales $1-Million Plant

Tubesales opened a new plant and offices at 2211 Tubeway, Los Angeles 22, Calif. Costing more than $1 million, the plant is devoted exclusively to the distribution of tubular steel products. The warehouse covers 129,000 sq ft, and the 8.5 acres of paved yard provide storage for many million feet of tubular products.

Sierra Drawn Steel Expands

Sierra Drawn Steel Corp., producer of cold-finished steel bars, has expanded the total area of its Los Angeles and Seattle plants to 30,000 and 10,000 sq ft.

Opens Two Fabricating Plants

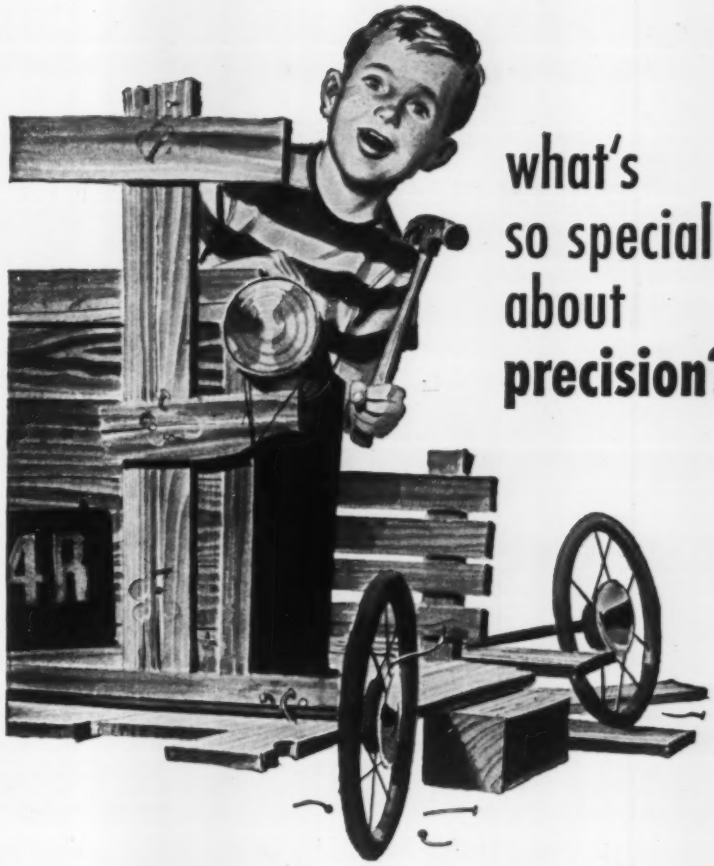
Automatic Sprinkler Corp. of America, Youngstown, has added two facilities to its regional network of fabricating plants. The firm has occupied a building at 5810 Corothers St., Cincinnati 27, O., and soon will occupy space in a building at Route 22 and Cassatt Ave., Berwyn, Pa.

Plans Research Laboratory

Cornell Aeronautical Laboratory Inc., Cheektowaga, N. Y., is constructing a $65,000 laboratory building that will house some of the equipment to be used in a $2-million research program for the Air Force. High speeds and high temperatures will be investigated.

Forms Vinnell Steel Corp.

Vinnell Co. Inc., Alhambra, Calif., formed a subsidiary, Vinnell Steel Corp., to continue the steel fabrication and erection formerly done by its Steel Division. Officers of the new company are: President, A. S. Vinnell; vice president and general manager, L. M. Ballard; vice president and treasurer, L. E. Howard Jr.; vice president, F. S. McNamara; vice presi-



To this little fellow building the 1956 "dream car", precision is a bent nail or a split board. To modern automotive engines and aircraft power plants, PRECISION is a most important element.

That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought fastener to meet your specifications. And remember, at Chandler . . . there is nothing special about PRECISION because we do it every day.

6862-CH

Write today for Bulletin 1264-CH

CHANDLER PRODUCTS CORPORATION

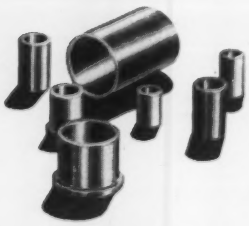
1488 CHARDON ROAD • CLEVELAND 17, OHIO

YOU GET more* WHEN
YOU BUY BEARINGS FROM
YOUR Bunting® DISTRIBUTOR

*more convenience

ONE OF BUNTING'S MOST VALUABLE PRODUCTS is convenience—and it doesn't cost you a cent. You can choose from 1,117 stock sizes of Bunting Cast Bronze Bearings and Bars and 751 stock sizes of bearings and bars made of Bunting Sintered Powdered Oil-filled Bronze. You can procure all these products from the ample stocks of Bunting distributors in all manufacturing areas of America. All are precision, highest quality products, completely finished and ready to use.

All Bunting Sintered Bronze Plain and Flange Bearings are stamped with part number—an exclusive Bunting feature.



Your Bunting distributor is listed in the classified section of your telephone directory usually under Bars—Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.

Bunting

BUSHINGS, BEARINGS, BARS AND SPECIAL PARTS OF CAST BRONZE AND POWDERED METAL.

The Bunting Brass and Bronze Company • Toledo 1, Ohio • Branches in Principal Cities

dent, T. G. Griffiths; secretary, Sam Gill; assistant secretary, A. G. Sattler.

Plans Machine Parts Plant

Owens-Illinois Glass Co., Toledo, O., plans to build a machine parts manufacturing shop at Godfrey, Ill. Machine parts are now made at the firm's Alton, Ill., shops.

True-Temper To Build

True-Temper Corp., Union City, Pa., will erect a $580,000 plant to replace its present building. The new plant will go into production about Sept. 1.

Scovill Opens Branch Office

Scovill Mfg. Co., Waterbury, Conn., opened a branch sales office at 2882 W. Liberty Ave., Pittsburgh 16, Pa., under the direction of H. A. Littell. Brass and aluminum mill products will be handled.

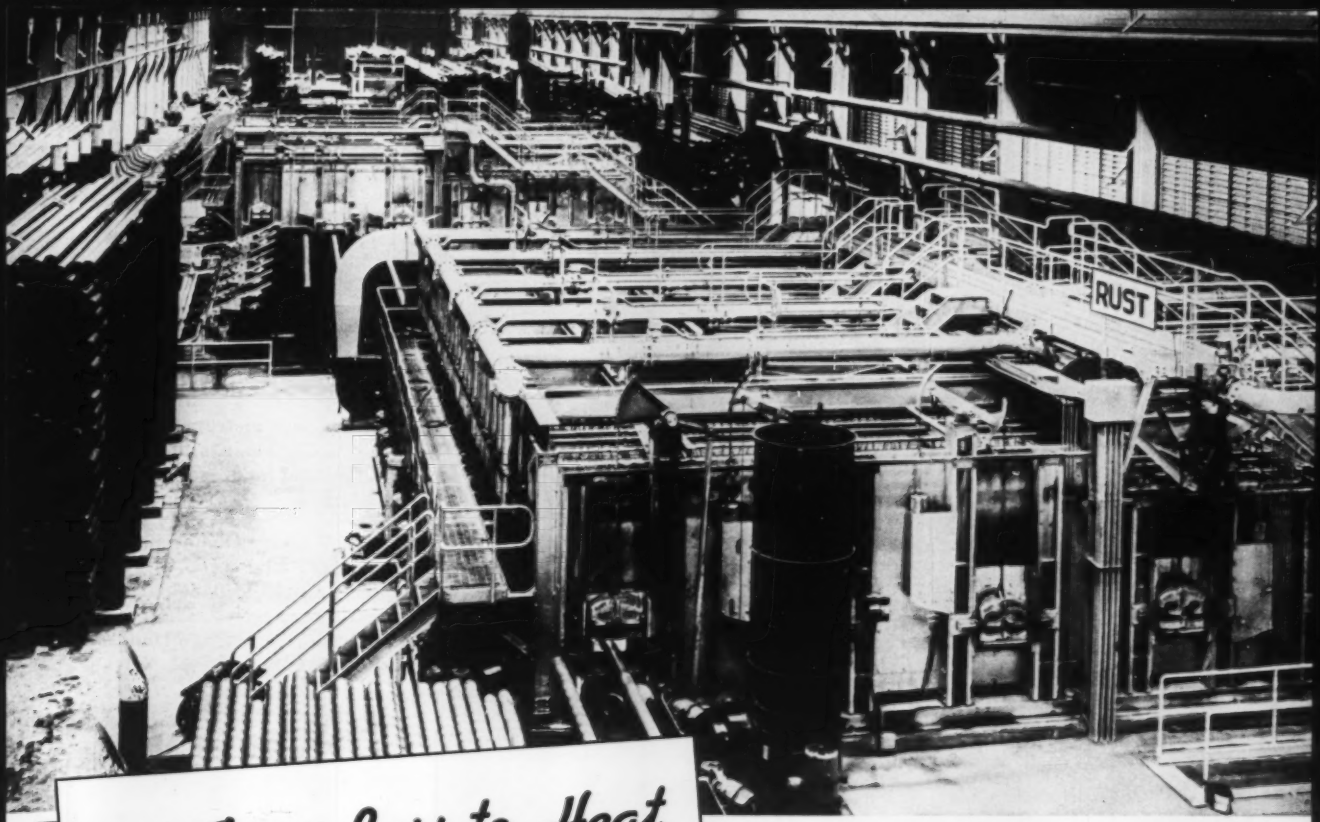
CONSOLIDATIONS

Bettinger Corp., Waltham, Mass., acquired **Porcelain Enamel Products Co.**, Rehoboth, Mass. Bettinger makes ceramic-on-metal products and coatings for architectural and industrial uses. Porcelain Enamel Products makes a line of ceramic-on-steel wall tile and accessories.

Bell Aircraft Corp. purchased **Lake Erie Engineering Corp.**, maker of hydraulic presses. Both firms are in Buffalo.

Harris-Seybold Co., Cleveland, and **Intertype Corp.**, New York, will merge, subject to stockholders' approval. The combined organization would be known as Harris-Intertype Corp. Harris-Seybold is primarily a producer of printing presses, while Intertype specializes in typesetting equipment.

Detroit Gray Iron Foundry Co., Detroit, purchased **Valley Steel Casting Co.**, Bay City, Mich. This additional capacity in its steel casting division will enable the Detroit



116 Tons Less to Heat in this roof

because of B&W Insulating Firebrick suspended construction

Here's another case where light weight means lower cost. The roof of this walking beam furnace is 2,320 square feet. B&W Insulating Firebrick suspended construction for a 9-inch roof weighs about 30 lbs per square foot, including the weight of rods, hangers, pipe, brick and mortar. This is approximately 100 lbs per square foot less than an arch constructed of heavy firebrick plus insulation having the same heat flow. *This saving means the B&W IFB roof is 116 tons lighter.*

The new walking beam furnace (shown in photograph above) was designed and constructed by Rust Furnace Company for Jones & Laughlin Steel Corporation. Seamless pipe is conveyed into the furnace, moves slowly from left to right on walking beam rails designed and furnished by York-Gillespie Mfg. Co., and passes out the exit door.

Here are the money-saving benefits of B&W suspended construction:

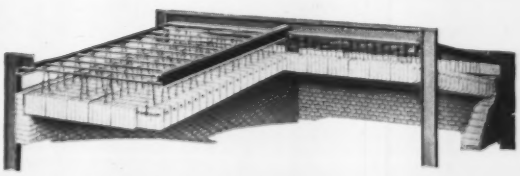
1. Supporting steel is less massive, far less costly. Commercial size steel can be used for roof suspension instead of special castings.

2. B&W Insulating Firebrick heat up and cool down faster. This means lower fuel costs, faster inspection.

3. Furnace temperatures can be changed quickly. When different steels call for different heating schedules, the furnace temperature can be adjusted in minutes instead of hours.

4. Installation costs are lower because these lightweight brick can be handled faster and easier than ordinary heavy firebrick.

For complete information on B&W IFB—the *lightest* weight insulating firebrick, write to B&W today or call your local Refractories Engineer.

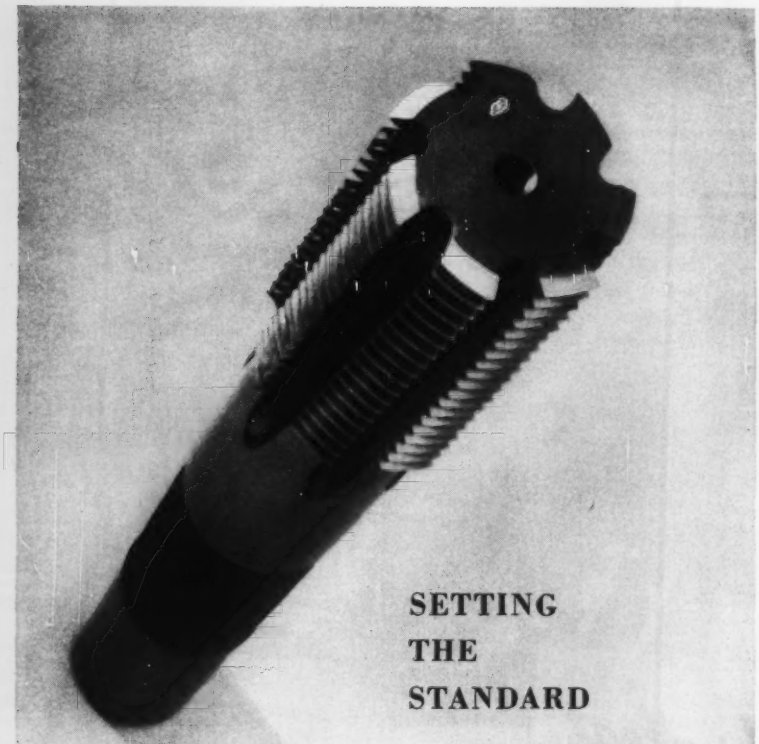


This is a cross-sectional drawing of a typical suspended arch arrangement using B&W Insulating Firebrick. It can be used in flat or sloping roofs, nose arches and many other types of suspended furnace construction.

BABCOCK & WILCOX

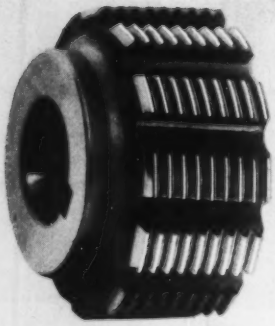
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST. NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R 939



SETTING THE STANDARD

Your production requirements demand this standard—Hanson-Whitney's exclusive *finished-after-hardening* process. This assures extremely close limits in tooth spacing, form and relief for the entire line of multiple thread milling cutters. H-W ground form cutters provide minimum outside diameter run-out . . . do not restrict length of thread to be milled and maintain tolerances of parallelism or desired taper.



Where applicable, the H-W Cutter Insert reduces your tool costs. H-W Adapters, to suit cutter spindle tapers, can be furnished with Cutter Inserts.

Hanson-Whitney alone offers single source product integrity in machine tools, cutting tools, and precision gages. Consult H-W complete home and field engineering service on all threading problems. Local H-W distributors, with complete stocks—keep your production at peak levels. Write for complete literature.

Hanson-Whitney
COMPANY

Division of THE WHITNEY CHAIN COMPANY

178 BARTHOLOMEW AVE., HARTFORD 2, CONNECTICUT

TAPS : THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS

Gray Iron Foundry Co. to give complete casting service.

REPRESENTATIVES

Revere Copper & Brass Inc., New York, appointed Ziegler Steel Service Corp., Los Angeles, as its aluminum products distributor in the Los Angeles metropolitan area. Ziegler warehouses are in Los Angeles, Oakland and North Hollywood, Calif.

Baldwin - Lima - Hamilton Corp., Philadelphia, appointed D. Nast Machinery Co. as Philadelphia area dealer for its presses. The presses are manufactured by the Hamilton Division, Hamilton, O.

NEW ADDRESSES

Standard Can Corp. moved its offices. The address is P. O. Box 68, Ohio River Blvd., Leetsdale, Pa.

Clark Bros. Bolt Co., Milldale, Conn., moved its midwest office to 9500 W. Ogden Ave., Brookfield, Ill. S. A. Hurd is midwest sales manager.

Seal-Kote Inc. moved its general offices to 517 N. Market St., Wooster, O.

Branson Instruments Inc. and its subsidiary, **Branson Ultrasonic Corp.,** moved into a new plant at 37 Brown House Rd., Stamford, Conn.

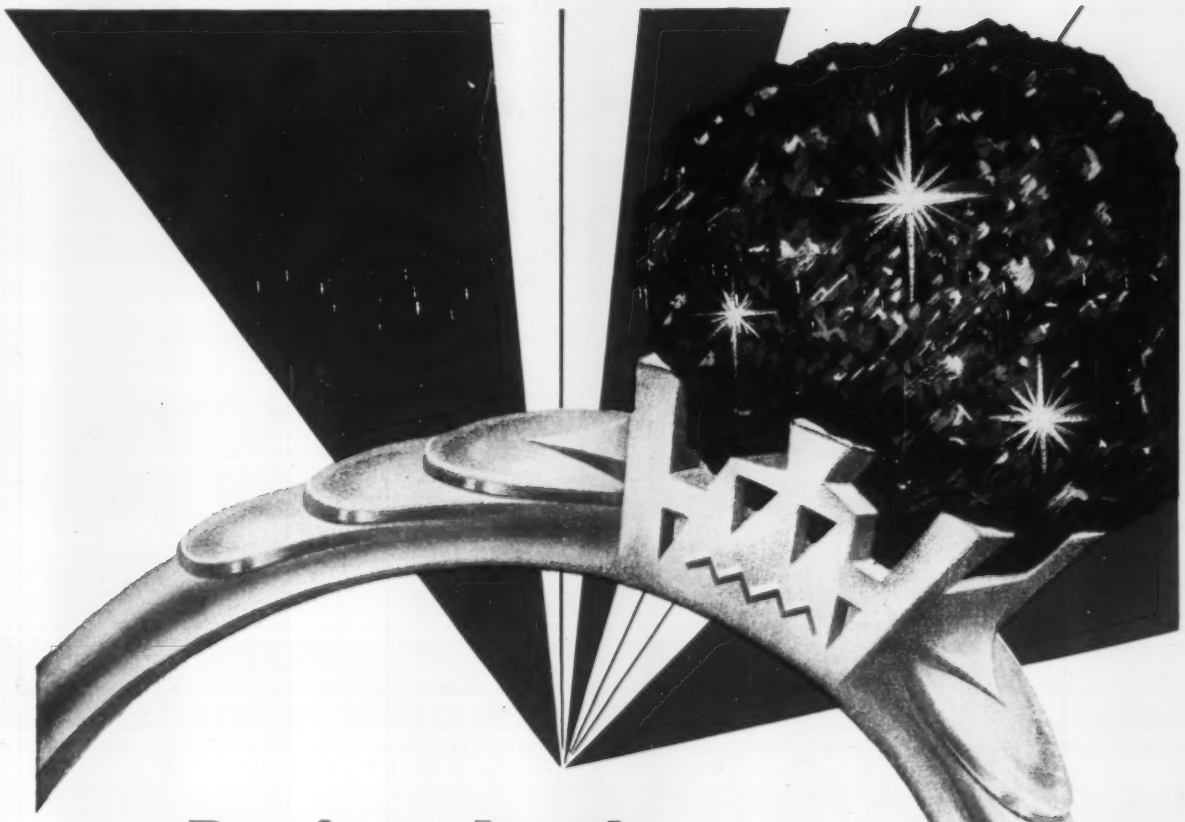
Reliance Electric & Engineering Co. relocated its general offices at 24701 Euclid Ave., Cleveland 17, O.

Wheeling Corrugating Co. opened its new warehouse at 1785 Kenny Rd., Columbus, O. The firm is a subsidiary of Wheeling Steel Corp., Wheeling, W. Va.

Murray Corp. of America's Easy Laundry Appliances Division established permanent headquarters for its executive, national sales and marketing offices in the Palmolive building, Chicago.

Buck Mfg. Co. moved into its

(*Please turn to Page* 150)



Precious Jewel of Industry's Future

"Black Diamonds" are America's most valuable resource for today and tomorrow! Only Bituminous coal can fully meet industry's needs for more electrical energy and more plant-power.

Convenient reserves of B&O Bituminous offer an unlimited supply of coals for every purpose, at low-cost. *Ask our man!*

LET OUR COAL TRAFFIC REPRESENTATIVES suggest a B&O Bituminous for your needs.

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BALTIMORE & OHIO RAILROAD

Bituminous Coals For Every Purpose

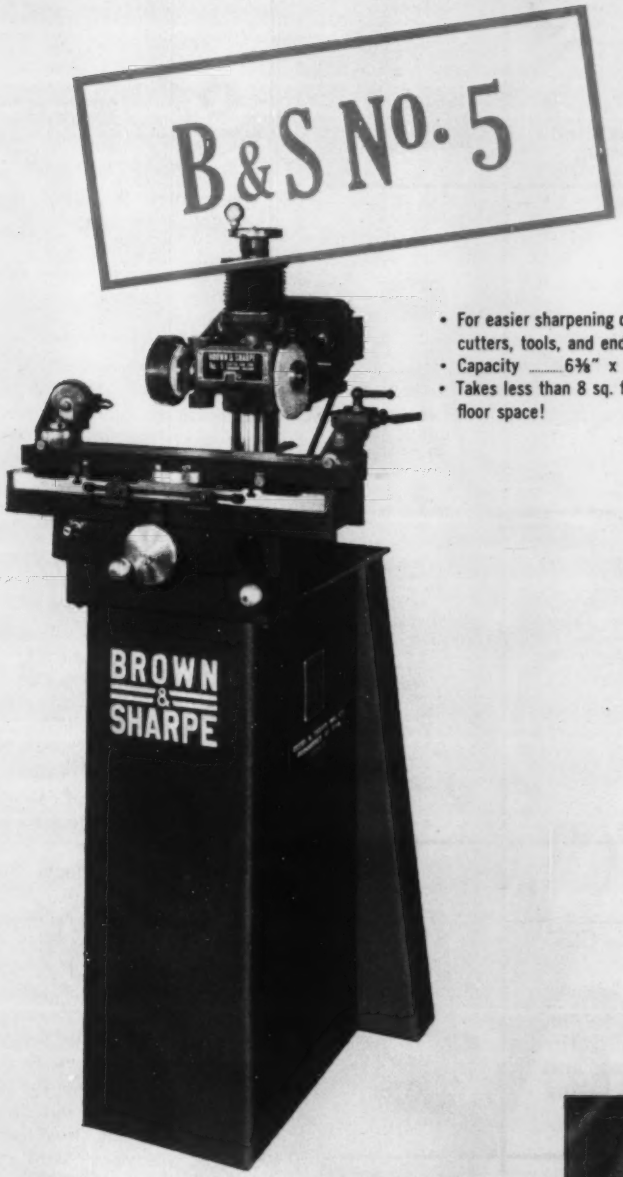
LINKING 13 GREAT STATES WITH THE NATION B&O ®

2 COST-CUTTING WAYS to

B&S No. 10N
with Plain or Universal Equipment

- For top efficiency on routine sharpening, light external and internal cylindrical grinding, and surface grinding. Capacity _____ 10" x 20"
- Super-smooth transverse movement on unique roller bearing carriage.
- Permanently-mounted internal grinding attachment swings into work position!

Better Cutter and Tool Sharpening



- For easier sharpening of cutters, tools, and end-mills
- Capacity .....6⅜" x 17½"
- Takes less than 8 sq. ft. floor space!

Faster to set up, easier to handle, smoother in every detail of operation, these two Brown & Sharpe Cutter and Tool Sharpening Machines really save time! Both give you the same basic convenience-design that permits greater operating speed—consistent high precision on every job. For example: Wheel-mounting at both ends of the spindle for easy 360° maneuverability; eye-level elevating handwheel with wide-spaced graduations and adjustable zero; operating controls at both front and rear; super-precision spindle that greatly reduces wheel-truing time; unique roller bearing Precision Glide table-mounting for extra-easy movement; table dog design that makes reversal practically effortless. And a cutter bar attachment that *eliminates* critical table setting on peripheral sharpening of most arbor-type cutters!

What's more, many design features such as the roller bearing table and permanently-sealed, anti-friction wheel spindle assure you *lasting* troublefree performance. Write for complete specifications on these fast, economical sharpening machines. Brown & Sharpe Mfg. Co., Providence, R.I.

Both machines feature PRECISION-GLIDE roller bearing table movement for smoother operation, minimum wear, accurate alignment

Brown & Sharpe BS

MILLING, GRINDING, AND SCREW MACHINES • CUTTERS • MACHINE TOOL ACCESSORIES
PRECISION TOOLS • PUMPS

HAVE YOU TRIED THIS EXTRAORDINARY CLEANER?

Oakite Rustripper removes rust and heat scale in the same operation that removes oil. It avoids hydrogen embrittlement, damage to machined surfaces and other disadvantages of acid pickling.

Have you taken the four good steps?

How can cleaning costs be reduced 33% while cleaning quality is being improved? *See pages 7 and 8 of booklet.*

What are four easy ways to improve the average rinse tank? *See page 10.*

What causes hydrogen embrittlement during electrocleaning? What is the remedy? *See pages 15 and 16.*

Do you need a brass cleaner that gives better protection against tarnishing?

Oakite has a new brass cleaner that provides scientific protection against the oxygen that tarnishes brass and other copper alloys during the application of reverse current.

"It cut our cleaning rejects by more than 90%"

says a manufacturer who found that Oakite Composition No. 95 gave him:

BRIGHTER PLATING—All films removed . . . no residues, no undersurface shadows, no anodic blackening, nothing to impair the brightness of the electroplate.

FEWER REJECTS—Major causes of blistering and peeling eliminated . . . Consistent success in baking for 60 minutes at 300°F.

OAKITE PRODUCTS, INC.
34E Rector Street, New York 6, N. Y.

Send me the FREE booklets indicated below:

- ☐ Here's the best shortcut in the field of electroplating
- ☐ Four good steps toward better electroplating on steel
- ☐ What's NEW for electrocleaning brass and other copper alloys
- ☐ Good news about electrocleaning zinc-base die castings

NAME_____

COMPANY_____

ADDRESS_____

FREE
For further information, ask for booklet

OAKITE.

Technical Service Representatives in Principal Cities of U.S. and Canada

(*Concluded from page* 146)

new manufacturing plant and offices at 1355 N. Tenth St., San Jose, Calif. The plant increases the firm's capacity to produce magnetic tools 300 per cent.

ASSOCIATIONS

Association of Manufacturers of Chilled Car Wheels, 445 N. Sacramento Blvd., Chicago, Ill., changed its name to the **Railway Wheel Association.**

L. F. Hickernell, chief engineer, Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y., has been nominated to be treasurer of the **American Institute of Electrical Engineers,** New York. He will succeed W. J. Barrett who has been nominated to be president.

Hydraulic Institute, New York, national trade association of pump manufacturers, elected Noble Dean Jr. of Dean Bros. Pumps Inc., Indianapolis, president. Wayne Staley of the Duriron Co., Dayton, O., was elected vice president.

James W. Dunham, National Cylinder Gas Co., Chicago, was elected president of **Compressed Gas Association Inc.,** New York. Other officials are: First vice president, A. R. Olson, Suburban Propane Gas Corp., Whippany, N. J.; second vice president, C. E. Monlux, Linde Air Products Co., New York; and F. R. Fetherston, secretary-treasurer.

Cutting Tool Manufacturers Association, Detroit, elected L. H. Skoglund Jr. of Scully-Jones & Co., Chicago, its president. Other officers are: Vice president, R. M. Murdock, Murdock Tool Co., Detroit; treasurer, G. R. Smith, National Broach & Machine Co., Detroit; executive secretary, Martin J. Ewald.

H. B. Emerick, director of technical services for Jones & Laughlin Steel Corp., Pittsburgh, has been elected national chairman of the **Iron & Steel Division, American Institute of Mining, Metallurgical & Petroleum Engineers,** New York.

Automobile trim of Superior Stainless STRIP STEEL

You can't tell the age of a car by its stainless steel! After a thousand or *two hundred thousand miles* of driving, Superior Stainless gleams good as new. ● Enjoy the beauty of stainless on the cars *you* buy —costs you nothing in care, gives you everything in pride and pleasure!

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

BEST PROTECTION YET
for Ball Bearings
exposed to

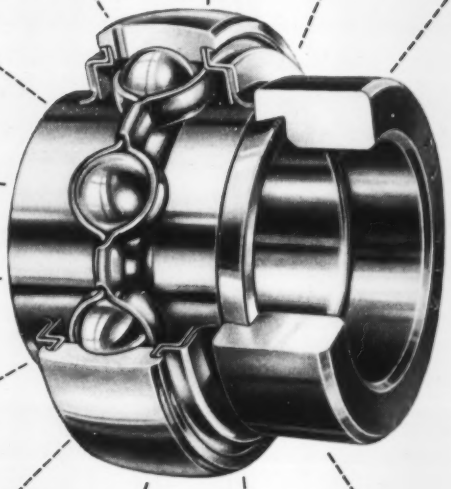
WATER

STEAM

DUST

LINT

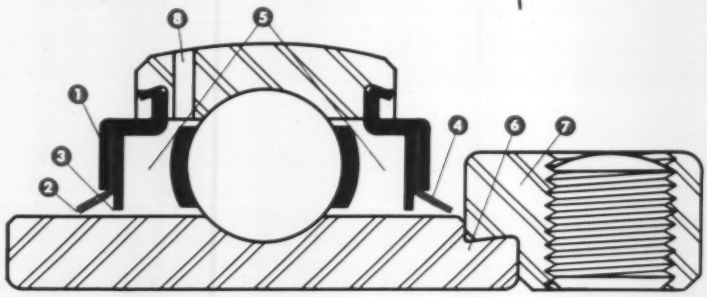
DIRT



FAFNIR
Wide Inner Ring
Ball Bearings with
Plya-Seals (contact type)

FEATURES

1. Plya-Seal of resilient Buna N rubber-coated fabric insuring proper "follow-up" contact
2. Seal rides in firm contact on ground outside diameter of inner ring
3. Close-clearance of inside metal shield with outside diameter of inner ring provides rigid support for seal
4. Flared lip of Plya-Seal won't push in
5. Generous space for lubricant
6. Wide inner ring for extra shaft support
7. Fafnir-originated self-locking, eccentric-cam-design collar
8. Relubricatable



On slow to moderate speed applications where service conditions are subject to excessive contamination, Fafnir Plya-Seal equipped Wide Inner Ring Ball Bearings fill a definite need. Their laboratory and field-tested performance offers the proven protection of contact-type Plya-Seals. They provide every advantage of Fafnir Wide Inner Ring Ball Bearings with Self-Locking Collars . . . ease of application, positive locking, extra large support area on the shaft, relubricatable or nonrelubricatable, self-alignments.

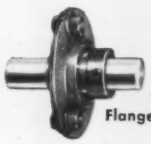
The Plya-Seal as incorporated in the Fafnir Wide Inner Ring Bearing consists of two steel plates between which is sandwiched a synthetic rubber-coated fabric sealing washer. Both steel plates are fixed securely in an outer ring groove. The inner plate provides a rigid backing for the seal and a close-clearance baffle for the retention of grease.

This recent addition to the Fafnir Line is dimensionally interchangeable with the Fafnir Wide Inner Ring Ball Bearings equipped with Mechani-Seals. All types are prelubricated at the factory. Write for descriptive bulletin. The Fafnir Bearing Company, New Britain, Connecticut.

FAFNIR WIDE INNER RING BALL BEARING WITH PLYA-SEALS AVAILABLE IN UNITS BELOW

RAK

RCJ


Flangette

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA

STEEL
March 11, 1957

Technical Outlook

CONTINUOUS CASTING—Look for the extension of this process to carbon steel, Inland Steel Co. reported to the AIME in New Orleans. The chief reservation: A constant volume of hot metal is required. This poses a problem for the open hearth and electric furnace shops because their tapping times are unpredictable. Inland indicated that the process should work well with the oxygen converter because of its highly predictable time cycle.

ANOTHER AIME MEETING NOTE—Oxygen conversion in a typical open hearth charge of hot metal, scrap and slagmaking components can be done by lancing through the doors. Heat is supplied only by hot metal and the oxygen reaction. Inland Steel Co. carried out tests with 125-ton heats in a modified open hearth producing low phosphorus, low sulphur, low nitrogen, high carbon steel from hot metal containing 0.07 phosphorus and 0.07 sulphur, without addition of large amounts of recarburizers or any external heat. The method appears practical for typical American shops, although a tilting-type open hearth would make slagging more efficient.

SOLVES PROBLEM—Woodworth Specialties Co., Binghamton, N. Y., a manufacturer of wire goods, is using Masonite Benelex 70 as a straightening die. Used instead of cast iron, it eliminates scratches and scoring. The wearing quality of the wood-based product is good.

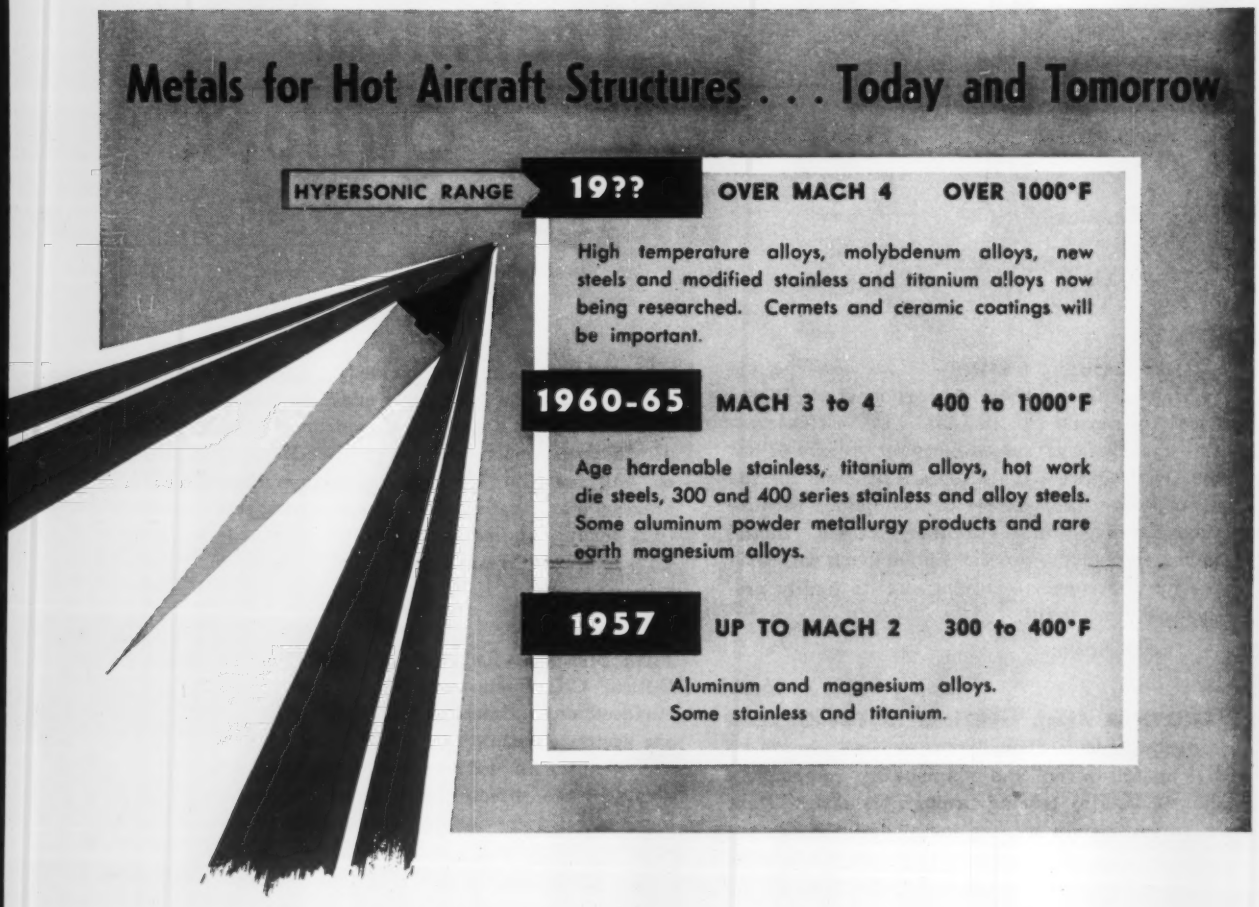
TIGHT JOINTS—A high temperature brazing alloy (Ni-Cr-B) solved a problem in brazed joint separation for the Al-Fin Division of Fairchild Engine & Airplane Corp. It involved the making of molecularly bonded, bimetallic hydraulic manifolds for guided missiles. The manifold consists of a preformed and brazed cluster of stainless steel tubes that is "Fer-Mag" bonded and cast into a magnesium housing. The brazing alloy, called Nicrobraz, resists separation during processing at 1300°F. It's made by Wall Colmony Corp., Detroit.

FINE FINISH—Engineers at Bausch & Lomb Optical Co., Rochester, N. Y., are producing surfaces on stainless steel hemispheres which are accurate within 4 to 6 millionths of an inch. They expect to do better with further refinements in the process. Need for the superfinishing method grew out of requirements of supersonic aircraft and missile research programs.

CLEANS COPPER—Instead of the usual acid pickle, a new process for cleaning copper uses a water solution of ammonium persulphate. Surface films are removed with a 30-second dip and retarnishing is retarded. The process works on both rolled and drawn copper and can be used to prepare the metal for laminating, electroplating and other coatings. It was developed by the Becco Chemical Division of Food Machinery & Chemical Corp., Buffalo.

EFFICIENT MINIATURE—A tiny electric motor developed by Howard Industries Inc., Chicago, is said to pack more power than many of its larger cousins. Some of its features: Quiet operation, low magnetic hum, reduced external magnetic field, and low temperature rise. The motors are being made for small equipment like tape recorders and office machines.

Metalworking Outlook—p. 105 Market Outlook—p. 227


Metals for Hot Aircraft Structures . . . Today and Tomorrow
HYPERSONIC RANGE
19??
OVER MACH 4
OVER 1000°F
High temperature alloys, molybdenum alloys, new steels and modified stainless and titanium alloys now being researched. Cermets and ceramic coatings will be important.
1960-65
MACH 3 to 4
400 to 1000°F
Age hardenable stainless, titanium alloys, hot work die steels, 300 and 400 series stainless and alloy steels. Some aluminum powder metallurgy products and rare earth magnesium alloys.
1957
UP TO MACH 2
300 to 400°F
Aluminum and magnesium alloys.
Some stainless and titanium.

Exploring the Thermal Barrier

AIRCRAFT is on the threshold of a new metals' age.

The chart at right from Lockheed Aircraft Corp., Burbank, Calif. shows materials used in today's military airframes and those which will be needed by 1965. Aluminum, now 75 per cent of the structure, will be replaced by steel and titanium for planes being designed for speeds of Mach 3 to 4.

Metals so used must stand the high outer skin temperatures generated at these speeds. The curve in Fig. 1 shows that the temperature rise is far out of proportion to increased velocity. Aircraft skin temperatures are said to reach 600°F at 2000 mph, possibly 1600°F at 3300 mph.

As planes go beyond the Mach 4 level, high temperature alloys now used in jet engine systems will find use in airframe parts.

Importance—Materials engineers building military aircraft want to know what these temperatures do to metals and the structures they go into. The answers they come up with will be of far reaching significance. They will be used in the development of commercial supersonic transports and other types of planes.

K. A. Wilhelm, Lockheed design engineer who supplied the chart above, says the suitability of a metal depends on such factors as:

1. Hot strength at operating temperature.
2. Hot strength after long exposure to elevated temperature.
3. Cold or room temperature strength after various exposures to elevated temperatures.
4. Corrosion protection during and after exposure to elevated temperature.
5. Creep under conditions of temperature and intermittent load.

Mr. Wilhelm says these factors are pertinent to structures:

1. Distortion of aerodynamic contour due to non-uniform heating.
2. Strength and stiffness under non-uniform temperatures.
3. Over-all strength and stiffness at elevated temperatures.

Structural changes caused by aerodynamic heating create new problems of fatigue, creep, rigidity and distortion, but the designer

has an even bigger worry: What is a satisfactory heat resistant airframe material?

Choices—Mr. Wilhelm says that if high strength aluminum and magnesium alloys are eliminated because of temperature, the designer is restricted to three metals: 1. High strength alloy steels. 2. High strength titanium alloys. 3. High strength heat and corrosion resistant alloys.

"In evaluating these," he says, "it becomes evident that high strength steel and high strength titanium alloys are the necessary choices for the first hot airplanes with a temperature environment of 600 to 700°F."

Attempts to compare the two promising candidates — titanium and stainless steel, turns up a variety of viewpoints.

Two Aces—Speaking along this line at a meeting of the Institute of Aeronautical Sciences in New York recently, Maj. F. C. Krug, Air Research & Development Command Headquarters, Baltimore, had this to say:

"One analysis and set of curves will show titanium head and shoulders over stainless steel, while another will prove the opposite . . . at this stage, neither can be proclaimed champion."

Continues Major Krug: "It's a healthy and desirable situation to have two white hopes of such promising caliber competing. It does appear at this time that some of the recently developed titanium alloys (such as 6Al-4V) may be slightly superior to the stainless steels (such as 17-7 PH) from a strength-weight point of view. But this advantage may seesaw as a result of research now in progress to improve the properties of 17-7 PH."

Another fact brought out by Major Krug is that steel alloys become increasingly superior to our present titanium alloys at temperatures above 850°F.

STAINLESS STEELS

Progress — Makers of precipitation hardening stainless steels are pushing research to improve the strength-temperature properties of their alloys.

Armco Steel Corp., Middletown, O., has developed a modified heat treatment, RH 950, to supplement the conventional TH 1050 treatment. (See Table 1.) For its 17-7 PH grade, this increases tensile strength from 180,000 to 200,000 psi, or 11 per cent. Minimum 0.2 per cent yield strength is increased from 150,000 to 180,000 psi, a 20 per cent gain.

The curves in Fig. 2 compare the tensile strength properties of 17-7 PH sheet specimens of condition TH 1050 with the new condition RH 950 up to 1000°F. The RH 950 treated sheets have higher strength over the entire temperature range.

R. G. Sloan, manager of Armco's Development Engineering Department, has this to say: "In the nine years Armco's 17-7 PH has been produced commercially, condition TH 1050 has been widely used in aircraft structural parts operating up to 800°F. In sheet form, it has offered the best combination of producibility, strength, workability and corrosion resistance for these conditions."

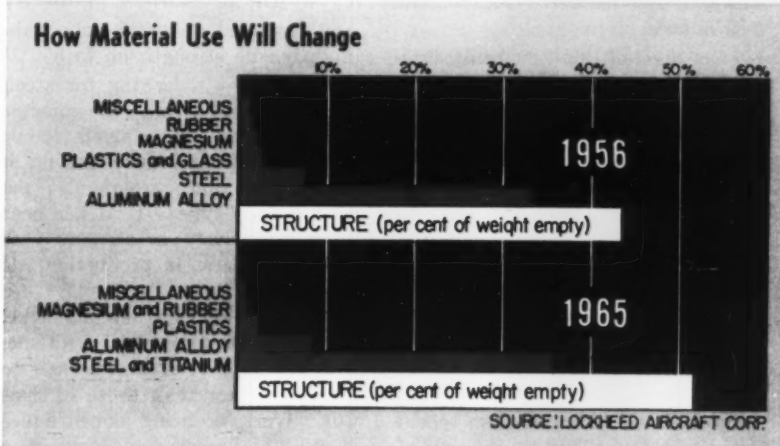
The fact that 17-7 PH stainless honeycomb panels (Fig. 3) were used in the nation's first supersonic bomber, the Convair B-58 Hustler, speaks well for the alloy's present position.

Keep Ahead — Mr. Sloan adds: "Properties resulting from the new RH 950 heat treatment improve this position. Beyond this, our research division is developing modifications of 17-7 PH that will further improve short time tensile and yield strengths, stress to rupture and creep values, and extend the usefulness to at least 1000°F."

But Armco metallurgists are looking further into the future. T. F. Olt, director of research, puts it this way: "While the 600 to 900°F strength properties of 17-7 PH stainless are considered adequate for immediate needs, future aircraft involve still higher strength requirements and operating temperatures. To satisfy these more stringent needs, we are working to develop more highly alloyed precipitating hardening steels."

Stainless W—Another member of the transformation age-hardenable group is U.S. Steel's Stainless W. It's hardened by a solution anneal at 1900°F, air cooling, then aging at about 950°F.

Room temperature tensile strength approaches 200,000 psi. Strength at elevated temperatures falls off, although it's still quite high: The tensile strength of 1-in. bars at 600°F in a typical test



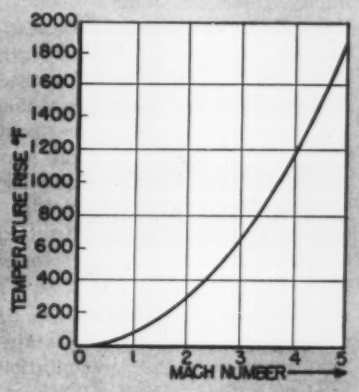


Fig. 1—Heat increases with speed

Table 1—Heat Treating Operation TH 1050 compared with new RH 950

	Currently Used	Proposed
	Condition TH 1050	Condition RH 950
Heat to	1400°F for 90 min	1750°F for 10 min
Cool to	60°F within 1 hr	—100°F for 8 hr
	Hold for ½ hr	
Heat to	1050°F for 90 min	950°F for 60 min
	Guaranteed Minimum Tensile Properties	
	Condition TH 1050	Condition RH 950
U.T.S. psi	180,000	200,000
0.2% Y.S. psi	150,000	180,000
% Elong. * in 2"	6	5

*For 0.060" and thicker.

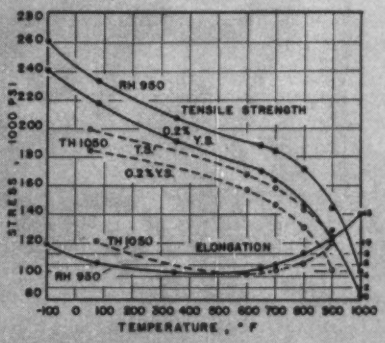


Fig. 2—Short time tensile properties of condition TH 1050 compared with RH 950 for Armco 17-7 PH stainless

is 162,000 psi; at 800°F, it is 145,000 psi.

Cold Treat—The so-called delayed transformation steels are on the list of promising airframe structural steels.

A steel of this type is Allegheny Ludlum's age hardenable stainless AM 350. Although it can be hardened by elevated temperature treatments, best properties are obtained by freezing.

Unique—Allegheny Ludlum metallurgists say the age hardenable alloys bridge the gap between the 300 and 400 grades. The easy forming properties of the austenitic grades are combined with high strength hardenable grades.

Adds the company: "Design calculations for the strength of structural members are complicated because in using continuous cold rolling to produce high strength material, mechanical properties are highly directional—they vary in the longitudinal and transverse directions. Because the high strength of alloys like AM 350 is obtained by heat treating rather than cold working, these properties are about the same. For all practical purposes, it should be possible to use a single strength value in such calculations, regardless of direction and whether stresses are tensile or compressive in nature."

Others—Republic Steel Corp. is working on high strength, stainless grades in the precipitation hardening field. V. W. Whitmer, assistant chief metallurgist, Central Alloy District, Massillon, O., says: "We are looking for yield strength over 200,000 psi at room temperature and elevated temperature tests will be made up to 1000°F. Our research is aimed at alloys using transformation and aging treatments."

U.S. Steel has several forced transformation steels under development. One, known as 17-7V, contains about 0.07 per cent carbon, 6 nickel, 16 chromium and 1 vanadium. After transformation and tempering, tensile strength is about 190,000 psi.

Ideal—Perhaps an ideal steel for aircraft structures would be a true age hardening one. When solution annealed, it should have the ductility of the chromium-nickel austenitic types. A simple aging treatment should harden it to strengths given by tempered martensite structures.

One steel of this type being studied in U.S. Steel's research laboratories contains 0.60 per cent carbon, 15 manganese, 14 chromium, and 2 vanadium. Its heat treatment consists of a solution anneal at 2100°F, followed by a water quench, then aging for 8 hours at 1300°F. Hardening results from precipitation of vanadium carbides.

High Strength—Because martensitic steels, typified by the 12 per cent chromium types 410, 420, 422 and modified 430, give high tensile strength for a given amount of ductility, they are promising candidates for aircraft use.

U.S. Steel reports: "The attainment of high strength—over 220,000 psi tensile strength is being given highest priority. However, our program includes nonmartensitic steels because other properties such as formability and corrosion resistance may turn out to be more important than strength for certain applications."

More Evidence—Crucible Steel Co. of America, Pittsburgh, also sees a bright future in aircraft for the straight chromium martensitic steels. The company says its 422 grade has the highest room temperature tensile properties of any stainless and maintains its tensile and rupture properties to a higher level—up to 1200°F.

The data in Table 3 (obtained by Lockheed and Boeing on Crucible 422 sheet austenitized at 1875°F and tempered at 900°F) show the high tensile strength up to 800°F.

Reminder—In looking for steels for aircraft structures, the common cold work austenitic steels should not be forgotten. Most familiar is the 17 per cent chromium, 7 per cent nickel—type 301. It has been used extensively in aircraft with a lot of success in production and applications.

USS Tenelon is a new nonnickel austenitic stainless steel with mechanical properties that appear to be even better than those of type 301. Work is being done to see if its high mechanical properties are retained up to 1000°F.

Table 2

Titanium Alloys for Elevated Temperature

Temp °F	Tensile Strength - psi Ti-6Al-4V	Ti-5Al-2.5Sn
70	138,000	125,000
400	110,000	100,000
600	96,000	85,000
800	87,000	81,000
1000	78,000	75,000

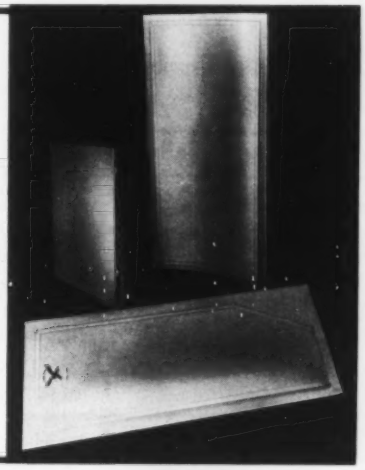


Fig. 3—These 17-7 PH stainless honeycomb panels were used in B-58

Finishing facilities for the conventional stainless grades are being expanded to produce more light gage, close tolerance, fine finish material.

The constructional alloy steels heat treated to give strengths close to 300,000 psi are also in the picture for hot airframes. W. V. Ward, Lockheed Aircraft Corp., told the ASM in Cleveland recently: When treated to 260,000 to 280,000 psi, 4340 can be used up to 400°F, Tricent to 600°F.

HOT WORK DIE STEELS

A group of hot work die steels has been used many years for tools requiring a high degree of toughness and strength at elevated temperatures. Their potentialities for hot aircraft structures are being explored.

E. A. Loria, staff metallurgist, Crucible Steel Co. of America, Pittsburgh, cites these advantages:

1. They have high ductility over a wide range of temperatures (−100 to 1000°F) and high strength up to 1000°F.

2. Between 400 and 1000°F, they have the highest strength-weight ratio of any commercial structural metal.

3. When heat treated to tensile strengths of 260,000 to 300,000 psi, they have advantages over lower alloy materials (such as modified 4340) because their tempering temperature is high.

4. A large measure of stress relief is possible, and they are air hardenable.

Mr. Loria says that today's research is aimed at a room temperature strength of 300,000 psi and resistance to softening at 1000°F. A tensile strength of 250,000 psi at 1000°F with a 0.2 per cent yield strength of 225,000 psi and 6 per cent elongation is possible.

He continues: "Such properties (and even higher notch tensile results plus good V-notch Charpy results) have been obtained in our new Peerless 56 which is in the commercial development stage."

Other makers of hot work die steels are optimistic about aircraft structural applications.

Others—Says John C. Hamaker Jr., manager, research department, Vanadium-Alloys Steel Co., Latrobe, Pa.: "From an extensive study, we have concluded that a 5 per cent chromium steel such as our Vascojet 1000 provides the optimum combination of toughness and high fatigue strength at ultrahigh strength levels with complete stability at 1000°F. This is made possible by a secondary hardness peak similar to high speed steel which permits tempering with complete stress relief at temperatures above 1000°F."

Reporting on its HWD #2, Firth Sterling Inc., Pittsburgh, expects wide use for it in these applications: 1. Leading edge wing skins. 2. Leading edge tail skins. 3. Landing gear components. 4. Fasteners and engine supports.

Corrosion — Allegheny Ludlum says that the 5 per cent chromium type hot work die steels should supply the aircraft design engineer with a material having good strength for reasonably long times up to 800 to 900°F. A possible disadvantage to its use in skins is poor corrosion resistance.

The company points out that it's possible to clad hot work die steel strip and sheets with either 302 or 304 stainless to overcome this deficiency. A 5 per cent chromium hot work die steel clad with 10 per cent 304 stainless has a strength of 270,000 psi at room temperature and about 200,000 psi at 800°F.

Problems — But tool steel producers still have work to do.

Here's how E. E. Hall, manager, technical services, Universal-Cyclops Steel Corp., Bridgeville, Pa. puts it: "While a considerable amount of mechanical property data have been developed by the various tool steel producers, they are still quite sketchy and come nowhere near supplying the information needed for aircraft designers.

"Knowledge of the effect of heating and loading rates, modulus of elasticity in tension and compression, creep and stress rupture data, thermal conductivity, emissivity, absorptivity, weldability and corrosion resistance is limited. Generally, producers of these hot work die steels are not equipped to determine much of this required information. It would be well for the aircraft industry or the Air Force to sponsor investigations which would evaluate the steels made by many producers."

Mr. Hall states that while the 5 per cent chromium types will apparently meet the strength requirements of the aircraft industry for a few years, they do not have ductility properties that make designers entirely happy. "Some modifications in chemistry are indicated," he says. "For example, we have a nickel modification, Thermold J, which we feel has better strength-ductility relationship than the regular type."

TITANIUM

Facing up to the facts in the race, titanium producers are working hard to develop improved al-

Table 3 — Elevated Temperature Properties of Crucible 422

Composition: C 0.22; Cr 11.7; Mo 0.94; W 0.93; V 0.26

Test Temp °F	Tensile Strength (psi)	Yield Strength (0.2%) (psi)
80	260,000	205,000
400	255,000	185,000
600	250,000	160,000
800	240,000	145,000

Specimens taken from coil 0.030 in. thick x 48 in. wide. Heat treated: 1875°F for 0.5 hr, air cool, then 900°F for 1 hr. Elongation 11 to 12%.

loys. Titanium has density of 0.161 lb per cu in., compared with 0.286 for steel. This is an inherent advantage if high strength alloys can be developed.

E. F. Erbin, metallurgical engineer, Titanium Metals Corp. of America, reports (see Table 2) that Ti-5Al-2.5Sn and Ti-6Al-4V have the highest elevated temperature strength.

Emphasis—The titanium people are concentrating on getting alloys with improved temperature-strength properties. Frank H. Vandenburgh, vice president and general manager, Mallory-Sharon Titanium Corp., told STEEL:

"Where 50,000 psi yield strength is required, the maximum temperature for which present titanium alloys are used is 650°F. If titanium is to continue to be an important aircraft structural metal in the higher thermal environments, alloys are required which will have good stability and properties at temperatures over 1000°F.

"Much work is being done to find suitable alloys which will have the necessary high temperature strength. For example, investigation is being concentrated on a titanium bar alloy which will show minimum creep when stressed at 45,000 psi for 300 hours at 1000°F."

Aircraft design engineers are helping, too, says Mr. Vandenburgh. They are studying operating conditions to determine what creep value can be allowed within the limits of operating efficiency.

Republic Steel's Mr. Whitmer comments: "Titanium alloys are operable in the 600 to 800°F range, depending on conditions of service. We have hopes of pushing this higher. A lot will depend on actual loading conditions, time at temperature and permissible deformation."

Sheets — Titanium sheet alloys for elevated temperature use are coming in for their share of the work. One sheet alloy under production study can be aged to yield strengths of 150,000 psi with 5 per cent elongation, says Mr. Vandenburgh. Another high temperature sheet alloy shows good strength and bend ductility after welding.

Mr. Erbin predicts that weldable titanium sheet alloys will be developed with tensile strength of 110,000 psi at 1000°F and good creep resistance.

HIGH TEMPERATURE ALLOYS

As speeds go above Mach 3.5 or 4, skin temperatures will probably exceed 1100°F. Higher temperature alloys must meet the needs here. Work is already pointed in this direction.

Nickel and cobalt base alloys have found a large number of high temperature applications in heat engines. But their transposition to aerodynamic applications requires different criteria for selection, say F. S. Badger and G. A. Fritzlen, Haynes Stellite Co., a division of Union Carbide & Carbon Corp., Kokomo, Ind.

Speaking before a conference on heat tolerant metals for aerodynamic applications sponsored by ASM at Albuquerque, N. Mex., recently, they reported that data are sparse. But the need is recognized. Test methods are being developed to determine the required properties, they reported.

Candidates—Some heat tolerant alloys Haynes Stellite people are looking at for aircraft structural applications are: Hastelloy alloy C, Hastelloy alloy R-235, Hastelloy alloy X, Inconel, Inconel X, Nimonic 75, Nimonic 80A, Haynes alloys No. 25 (L-605), Haynes Multimet alloy (N-155), and GE alloy J-1570.

Other companies which have experience with high temperature alloys are at work. International Nickel Co. has announced its Incoloy "T"—a nickel-iron-chromium alloy containing titanium. It's a strong sheet material for use up to 1400°F and higher in some applications.

Rigidity—Sandwich construction may influence metal development. Honeycomb structures hold great potential for increasing the efficiency of structures in compression. It will open up new markets for thin precision strip.

In the brazed honeycomb panels of 17-7 PH stainless used in the new B-58, the core material is 0.0015 in. thick. Cover sheets are generally 0.010 in. thick, but 0.005 and 0.008 in. sheets are used.

Light Alloys—Aircraft designers will always strive for the ultimate in weight reduction, so aluminum and magnesium must not be discarded as potential materials for the supersonic airframe. The Air Research & Development Command says studies with magnesium alloys made by pellet extrusion and by rare earth additions have produced promising aircraft materials. Sintered aluminum powder materials also deserve further study.

It remains to be seen, says ARDC, whether aluminum or magnesium alloys produced by these or other ingenious approaches will be able to compete with high strength steels and titanium alloys for elevated temperature service.

What sort of technical breakthrough is needed? ARDC lists these specs: A stiff, lightweight material usable in the 1000 to 1400°F range.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Advantages of Preheating Cupola Air Blast

1. Coke savings of 10 to 25 per cent.
2. Less loss of iron, silicon and manganese from oxidation.
3. Melting losses are decreased.
4. Chemistry is more uniform.
5. Bridging is eliminated.
6. Increased melting rate (average of 10 per cent).
7. Iron contains less sulphur.
8. Castings will anneal more readily.
9. Iron is 20 to 100°F hotter at the spout.
10. Scrap is reduced.

Hot Blast Cuts Foundry Costs

"No company now operating cold blast cupolas can afford not to investigate the merits of hot blast systems," says Carl F. Joseph, technical director, Central Foundry Division, General Motors Corp., Saginaw, Mich.

THE ABOVE advantages of preheating the cupola air blast were described by Carl F. Joseph at the Technical & Operating Conference of the Malleable Founders' Society in Cleveland.

There are two types of cupola blast preheaters. In one, the blast is preheated by using the waste sensible heat and the latent heat of the combustible carbon monoxide in the waste gases that pass up the cupola stack.

The waste gases are burned in a combustion chamber, and the resulting hot gases are passed through the tubes of a series of preheaters, while the air blast passes around the tubes in a counterflow system. Mr. Joseph presented two examples of this system (see case histories, page 160).

Second Type—The cupola blast at Central Foundry is preheated by indirect heaters which use an external fuel. Mr. Joseph explained that with special alloy heating elements, this system will preheat the blast up to 1000°F. But most installations are operating under 600°F.

Cost of the fuel in an externally fired unit is but a small fraction of the possible savings, Mr. Joseph said. In GM's malleable iron foundry at Saginaw, the blast is preheated to 400°F by 1000 Btu natural gas. About 180 cu ft are needed per ton of iron melted. The gas for a ton of melt costs about 9 cents (1000 cu ft costs 50 cents).

At the company's gray iron foundry at Defiance, O., the blast is maintained at 475°F. Last year's records show an average consumption of 410 cu ft of 1000 Btu natural gas per ton of metal. At 35 cents per 1000 cu ft, the cost per ton of melt is 14 cents.

Coke Savings—Because of improved and higher temperatures of combustion and the extra heat units available, coke savings will vary from 10 to 25 per cent.

Savings are affected by a number of factors such as coke to iron ratio, quality of coke, type of metal charge and temperature of the heated blast.

In GM's malleable plants, the coke saving is 15 per cent with a blast temperature of 400°F. In the gray iron operation, 22 per cent less coke is used with a heated blast of 475°F.

Less Bridging—One of the secrets of good cupola operation is to maintain clean and open tuyeres. In hot blast operation, ignition of the coke adjacent to the tuyeres is faster. This produces a higher temperature and practically eliminates bridging. Result: Clean and open tuyeres which make it possible to maintain closer control over the chemistry of the iron and the melting rate.

When operating a cupola over a 16-hour run with a cold blast, bridging is often a major problem. This is not so with the hot blast system.

Less Oxidation—Quicker ignition of the coke in the tuyere zone means a smaller oxidizing zone and less oxidation of the metal charge. This cuts melting losses of metalloids and reduces the width of the burn-out in the combustion zone.

Silicon and manganese losses are as much as 25 per cent less with the blast heated to about 400°F, and in some operations with 800°F blast no silicon loss is reported.

Less oxidation of the iron increases the fluidity of the metal, reduces the tendency to misrun and results in better feeding of the casting.

It is generally recognized that the annealability of white cast iron

Case histories of two malleable foundries using cupola gases to preheat the blast

	FOUNDRY A		FOUNDRY B	
		750°F		600°F
	Cold Blast	Hot Blast	Cold Blast	Hot Blast
Coke per ton of iron	260 lb	230 lb	260 lb	215 lb
Coke reduction		11.5%		17.3%
Coke bed height	66 in.	60 in.	68 in.	58 in.
Carbon average	2.80%	2.85%	2.80%	2.80%
Silicon loss	20%	0—15%, Avg 7%	20%	15%
Manganese loss	30%	30%	35%	37%
Foundry losses, misruns and hot tears		Lower than cold blast	Same	Same
Melting rate—tons per hour	22	24	22	24
Temperature of iron at cupola spout	2725°F	2820°F	2800°F	2850°F
Temperature of cupola gas entering hot blast	....	1600°—1800°F	....	1600°—1800°F
Charge	10% malleable pig, steel, scrap and alloys	Sprue, steel, scrap and alloys (no malleable pig)	13.5% malleable pig, sprue, steel, alloys	5% malleable pig, sprue, steel, alloys

is affected adversely by oxidation. Mr. Joseph believes iron melted under heated blast conditions anneals more readily.

Here is the analysis of GM cupola slag:

	Slag Composition (%)	
	Cold Blast	Hot Blast
Iron oxide	9.0	5.4
Manganese oxide	6.9	4.0
Silicon dioxide	48.0	46.0
Aluminum oxide	15.0	13.0
Calcium oxide	16.5	27.0

This indicates that iron oxide, silicon dioxide and manganese oxide are higher in the cold blast operation and means that the company is throwing away iron, silicon and manganese when it is not operating with a heated blast.

Cost Savings—An increase in the percentage of steel in the cupola charge usually increases the oxidation of silicon and manganese.

When steel scrap is cheaper than pig iron, it is possible to use more steel in the metal charge when a heated blast is used without any increase in oxidation.

More Efficient—The thermal efficiency of a cupola is determined by the temperature of the iron at the spout and the amount of coke used to melt the iron.

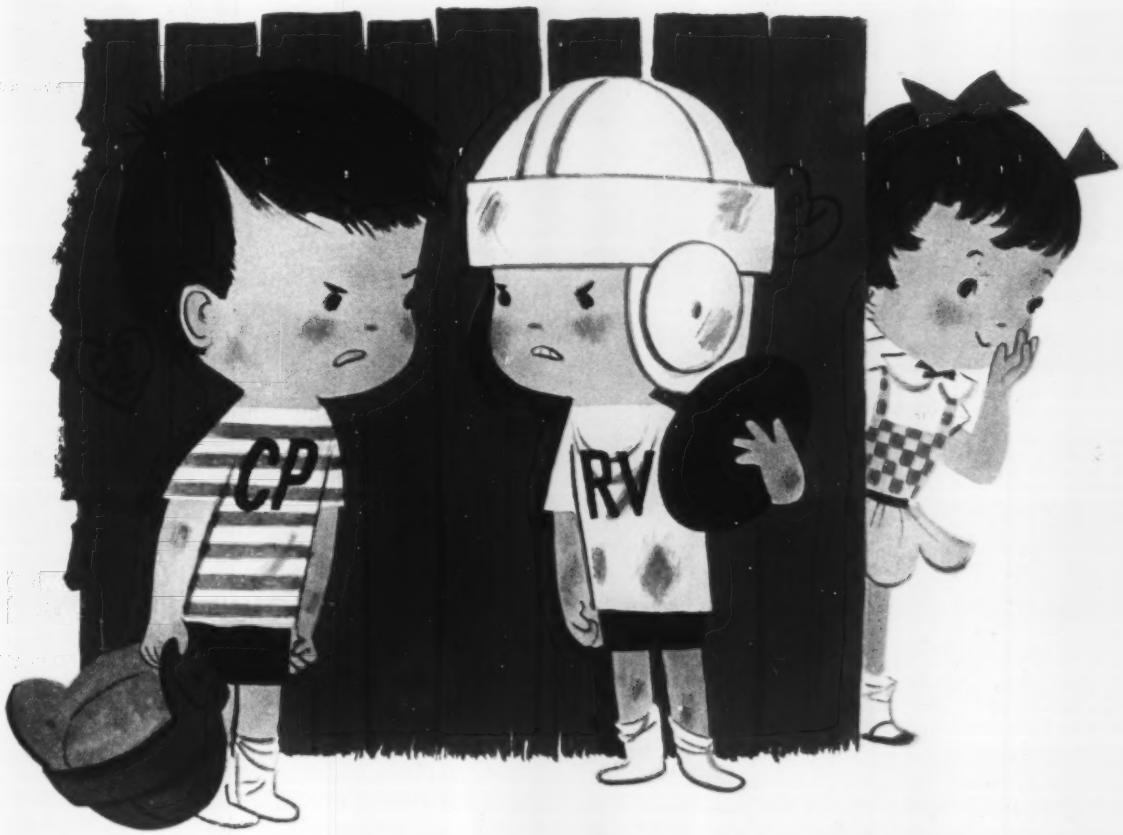
In comparing two cupola operations in which the 400°F hot blast cupola produces 10 per cent more iron at a temperature 20°F higher with 15 per cent less coke, the calculated thermal efficiency of the cold blast cupola is 43 per cent, compared with the 55 per cent efficiency of the hot blast system.

Chemistry—Sulphur content of the iron is reduced by the hot blast. There are two reasons for this. Less coke is used per ton of iron melted, and the iron is hotter at the cupola spout.

Sulphur reduction is 0.01 to 0.03 per cent. Less soda ash is needed for desulphurization.

The more uniform chemistry and melting rate should result in less scrap. Elimination of bridging at the tuyeres is the chief reason for the improvement.

USCOLITE PLASTIC PIPE



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Making Quality Leaded Steels

Melters of this material are giving close attention to production methods. Zooming demand is outstripping supply. New production tool: The x-ray spectrograph

THE TREND toward greater use of leaded steels is putting emphasis on increased production and quality control.

These figures are supplied by Harold R. Boatman, Inland Steel Co., Chicago: Using 1952 as the base year, domestic production increased 125 per cent in the 1952-54 period, 550 per cent in the 1954-56 period—when you use a six-month average for 1956.

Supply — There's evidence that some applications are being restricted because of limited production facilities. Melters of leaded steels are giving close attention to their production methods to make every heat count.

At a recent meeting of the Pittsburgh section, AIME, National Open Hearth Conference, metallurgists gathered in an off-the-record session to discuss methods for more efficient production of leaded steels. One of the speakers, C. H. Weimer, mill metallurgist, Copperweld Steel Co., Warren, O., explained: "Leaded steel sales are growing, forcing us to take steps to get more production from existing facilities. One area in which we are speeding production is testing. It formerly took us 30 to 40 hours to test a heat of 20 ingots chemically; now, by x-ray spectrograph, the test takes 1 hour."

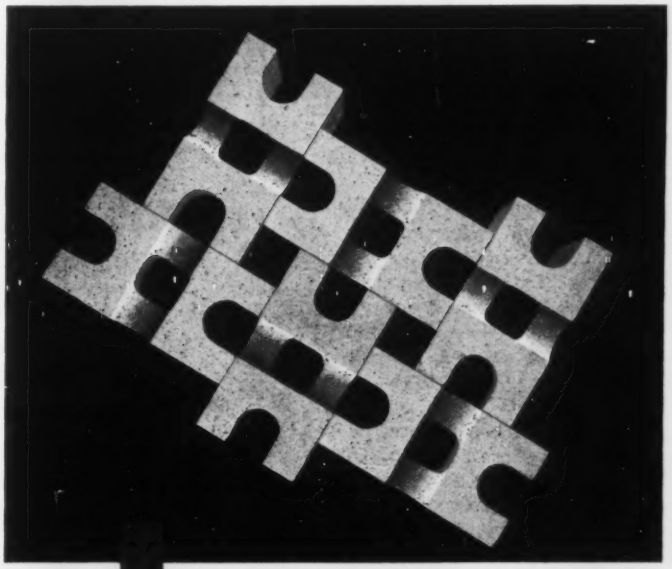
Electric Furnaces—Steel to be leaded is normally produced in one or two of Copperweld's electric furnaces in Warren. They are basic electrics, ranging from 40 to 65 tons in capacity. Melting practice for a given type of steel is the same, whether it is leaded or non-leaded.

Adding lead to the steel is a precise, carefully controlled procedure and the effects of running stoppers, skulls or poor pouring prac-

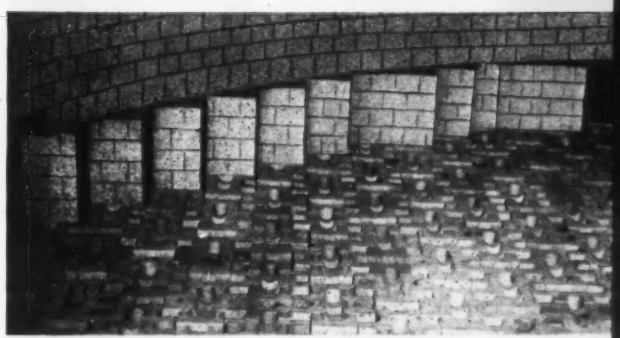
New design provides

25% to 50% GREATER HEATING SURFACE

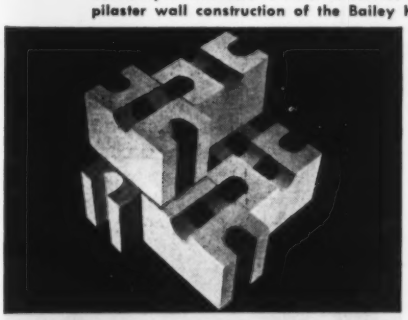
than ordinary basket weave checkers



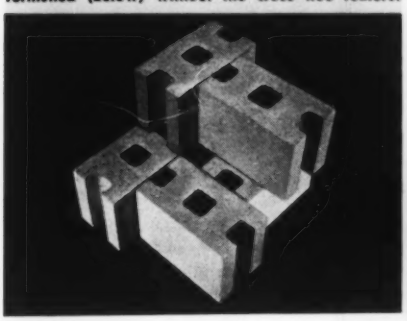
KENNEDY BLAST FURNACE STOVE CHECKERS



Tendency of checkers to twist in service is overcome by pilaster wall construction of the Bailey Hot Blast Stove.



The regular Kennedy Checker (above) is of 3-hole design with unobstructed flue openings, 1¼" minimum wall thickness and a cross flue. It also can be furnished (below) without the cross flue feature.



This new 3-hole checker shape is laid in basket weave style to produce a solid 1¼" wall between each flue. This assures greatly increased heating surface without sacrificing the advantages of basket weave design.

The increased heating surface of the Kennedy Checker results in a correspondingly lower stack temperature. This makes possible the use of a modern steel bottom for supporting the checker system.

Write for Bulletin

WILLIAM M. **Bailey** COMPANY

ENGINEERS

LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD PITTSBURGH 16, PA

tice are especially pronounced. The process is sensitive to shady or cold heats. "With the electric furnaces, we are able to adequately control tapping and pouring temperatures to maintain uniformity and distribution of lead," says Mr. Weimer.

Leaded Ingots — Copperweld's standard mold size produces an 18½-in. mill ingot. The number of ingots in a heat may vary from 16 to 30. Ingot size is not a limiting factor, explains Mr. Weimer. Leaded ingots up to 26 in. in diameter, weighing 10,000 lb, have been produced.

The lead is in the form of fine shot—it passes 20 mesh, is retained on a 40 mesh screen. The shot, which must be dry, is added on the pouring platform as the steel moves from the ladle into the molds.

Under Pressure—Shot is introduced (under air pressure) through a gun into the molten stream as it passes through the hot top into the mold. About 20 per cent of the ingot is poured before the gun is opened.

The lead is stopped before the rising metal has reached the hot top line. Time required for adding lead depends on the size of the ingot and the pouring rate. The rate of lead addition must be adjusted to meet any variation of ingot pouring rates. Precise control of this procedure is of paramount importance.

Lead recovery, as determined by analysis of the lead treated steel, depends on satisfactory pouring temperatures and pouring practice, smooth, positive application of shot at the proper time and a certain degree of skill on the part of the operators.

Fume Control—Removable hoods are placed at the top of all molds before pouring begins. Fumes, which are generated as the mold is filled, are sucked into a collecting system through the hoods.

Hoods are formed to fit on the hot top without interfering with pouring. Each hood may be dampered. The proper manipulation of hoods, dampers and the venting system gives Copperweld more than adequate fume control. Regular physical examinations of all personnel verify this fact, Mr. Weimer states.

The atmosphere in this area and others (such as at rolling mills) is analyzed for lead. At no time has it approached the maximum safe concentration, commonly known as the "threshold value," Mr. Weimer adds.

Testing — Metallurgical control is exercised through the inspection of exudation samples (commonly called sweat tests) taken from blooms or billets. The lead content of each ingot also is determined from bloom or billet samples.

In the early days of leaded steel production at Copperweld, lead content was determined by the chemical or gravimetric method. It was succeeded by the emission spectrograph, which involves the drilling of each sample. Drillings were prepared and compressed into small briquettes suitable for clamping in the holder of the spectrograph. Conventional emission spectrograph procedure was followed.

Too Slow—Late in 1954, Copperweld found that orthodox methods for checking lead content were too slow to keep up with its constantly increasing mill output.

Copperweld's chief chemist, Roy

To Improve Quality of Leaded Steel . . .

1. Carefully control the rate and timing of feeding lead. It's necessary for a high-quality product.
2. A specially trained metallurgical inspector should control all phases of lead addition. This work requires knowledge of flow characteristics of steel. There's a tendency for lead to segregate at the bottom of the ingot, so it should not be added too soon.
3. Make complete chemical analyses. They help build customer acceptance.
4. Both lead shot and the air stream must be dry, with no moisture in the nozzle. Producers must avoid any break in the flow rate.
5. Lead shot must be small and uniform. It should be stored in a dry room and screened to eliminate lumps.
6. Maintain stand-by equipment. It will eliminate the risk of a costly halt in production.

Time to determine lead content for heat of 20 ingots

	Specimen Preparation	Over-all Time
Chemical (Gravimetric)	1½-hours	30-40 hours
Emission Spectrograph	3 hours	4-5 hours
X-Ray Spectrograph	Negligible	1 hour

Source: Copperweld Steel Co.

Adding lead to the mold is a carefully controlled procedure. At Copperweld, it's added as the steel is poured

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LEADED STEELS . . .

Lab, and engineers of North American Philips Co. Inc. co-operated in the design and development of an x-ray spectrograph for this application.

An x-ray tube is mounted beneath a flat metal table so the rays strike the specimen from below. The operator places a specimen on the table, closes the ray-proof cover and presses a button on the control panel. A timing device turns the power off after a selected interval. Total pulse count is read off an instrument dial. The lid is raised, the coupon turned 90 degrees and the count repeated. This double test takes less than 1 minute.

This analytical test is simple compared with its predecessors. A cold-sawed surface is satisfactory.

Open Hearths—Jones & Laughlin Steel Corp. has just put a Copper-weld model x-ray spectrograph into operation at its Aliquippa, Pa., works. J&L prepares its heats in open hearths.

W. D. Smith, open hearth metallurgist at J&L, describes production techniques: "Equipment for adding lead includes a high velocity air stream carrying lead shot. An electrically controlled volume of fine dry shot descends from a storage tank (1400 lb capacity) which is mounted on the side of the pouring crane. It pours into a feeder and is forced through a flexible hose by the air stream under 18 to 25 psi."

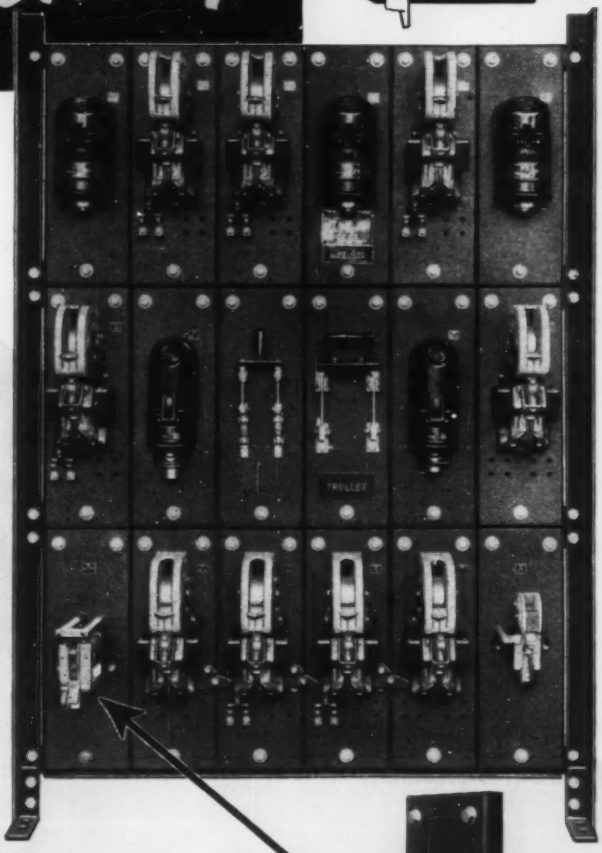
Operation—"The lead gun is 53 in. long and weighs 45 lb," says Mr. Smith. "It rests in an adjustable cradle mounted on the ventilation buggy and is aimed at the steel stream as it leaves the ladle.

"An electric control panel on the pouring platform controls the lead addition. J&L is now adding lead to six standard grades of steel at Aliquippa. Lead-to-steel ratio averages 6 lb of lead to 1 ton of steel. Lead recovery in the steel runs 70 to 75 per cent of the amount added."

At the Aliquippa plant, blooming mill practice, including heating and rolling, is the same for leaded and nonleaded steels. Leaded steels require special tests and shearing procedure. Most of it is converted into cold-drawn bar stock.

when stopping DC Motors

EC&M's Rectifier Plugging Control System gives FULL PROTECTION!

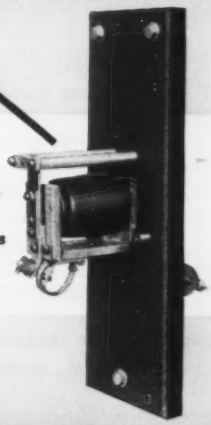


• This is the simplest of all plugging control systems for D.C. mill and crane drives. Only a small rectifier and single-coil mill-duty relay are required. They are connected across the motor armature for operation by counter-emf. The relay allows the plugging contactor to close immediately when starting from rest. When reverse-power plugging is applied to stop the motor, the rectifier permits the relay to pick up and hold open the plugging contactor. As the motor reaches stand-still, the relay drops out to close the plugging contactor and to allow acceleration in the opposite direction.

TWO-STEP PLUGGING CONTROLLERS are available for use on heavy inertia loads such as ore bridge trolleys and ladle crane bridge motions. Ask an EC&M Engineer to explain the improved operation of D.C. motors by Rectifier Plugging.

HERE'S WHY EC&M GIVES MOTOR DRIVES BETTER PROTECTION

- ✔ **POSITIVE RESPONSE** • Relay operates directly from counter-emf of motor.
- ✔ **RELIABLE OPERATION** • Unaffected by line voltage variation. Unaltered if taps on accelerating or plugging resistors are changed.
- ✔ **FULL PROTECTION** • Relay picks up at any speed above 10% of F. L. motor speed. Drop-out occurs as motor reaches standstill.
- ✔ **SIMPLICITY** • Single-coil relay and small rectifier. No electrical interlocks.
- ✔ **LESS MAINTENANCE** • Relay does not require adjustment-maintenance.



View of Type FKP Relay used on EC&M D-C Magnetic Controllers

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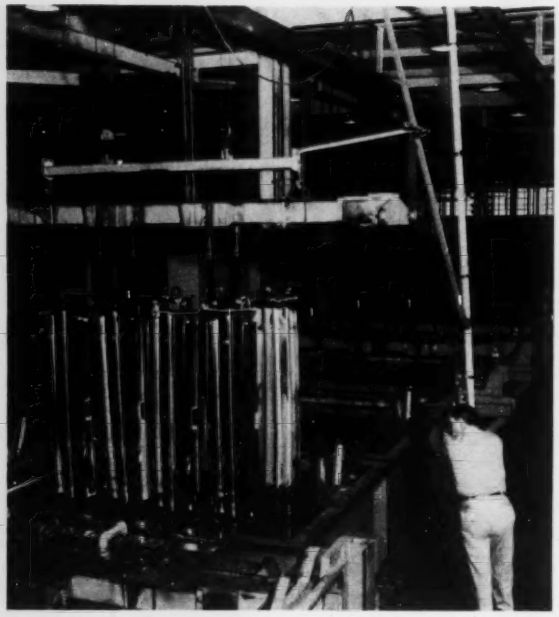
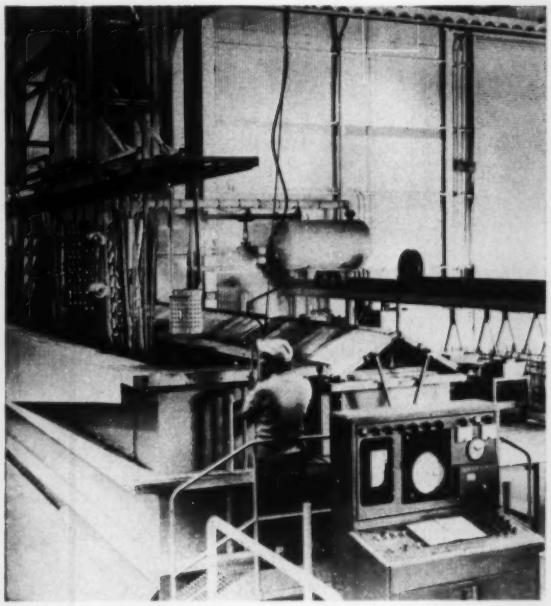


Plating tanks of semiautomatic bumper plating line at Rheem Automotive Co.



Automatic aluminum anodizing equipment at Douglas Aircraft Co.

Germanium Rectifiers Power Plating Line

They produce 160,000 amperes to plate bumpers at Rheem Automotive Co. Douglas Aircraft Co. powers automatic anodizing equipment with a 3000-ampere rectifier

GERMANIUM rectifiers have become important in power supplies for high current loads, particularly electrochemical applications.

They are being used to produce 160,000 amperes of direct current to power a semiautomatic bumper plating line at the new Fullerton, Calif., plant of the Rheem Automotive Co.

The equipment for automatic anodizing of aluminum parts at Douglas Aircraft Co., Torrance, Calif., is powered by a germanium rectifier.

Rapid Growth—Applications for industrial germanium power rectifiers have grown tremendously since the first units were installed little more than three years ago. Two factors have contributed to this:

The recent trend toward greater use of direct current from rectifiers to gain the advantages of more accurate control, and the specific advantages of germanium for many applications. Examples: Electrolytic cleaning, battery charging, copper refining, multicircuit welding, arc-light power supplies, aluminum pot lines.

Plating Line—Rheem uses 15 and 18 volt, air-cooled units built by General Electric's Rectifier Department, Lynn, Mass. Eighteen 18-volt units are housed in 5000-ampere cubicles mounted on the mezzanine floor. They power the nickel plating tanks. Two 15,000 ampere and two 20,000 ampere units, each rated at 15 volts, are mounted on the floor.

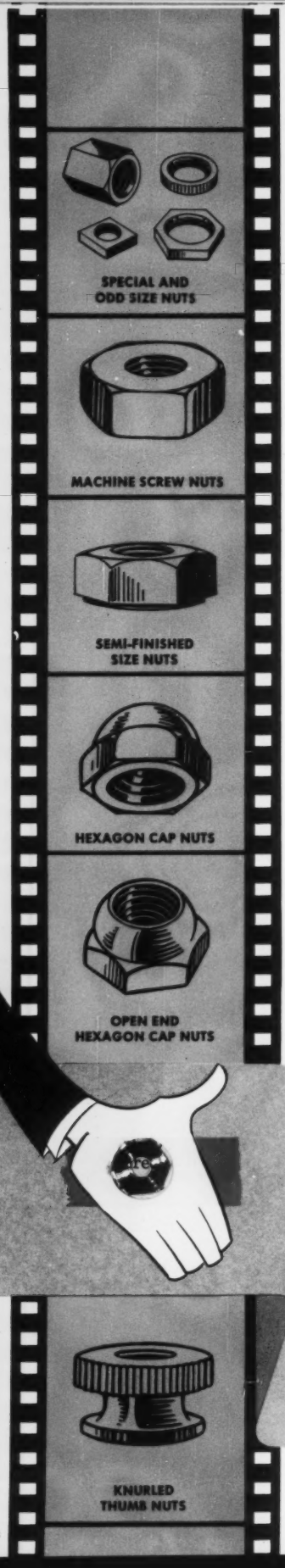
Each cubicle contains three blowers, five power trays and five transformers. Germanium cells are hermetically sealed from the plating room atmosphere that would quickly cause corrosion to other types of power conversion equipment.

The germanium plating rectifiers have a full load efficiency as high as 85 per cent, say GE rectifier specialists.

Anodizing — Douglas' anodizing setup uses a 3000-ampere, 50-volt GE rectifier. It is equipped with a special control that starts the anodizing cycle under constant current conditions and limits current flow until the anodic film builds up.

At the desired voltage, the unit switches to automatic voltage control until the process has been completed. The entire cycle is adjustable and automatic.

This is precision



and this is the story of

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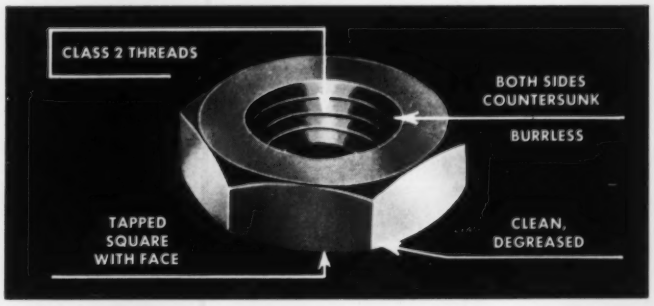
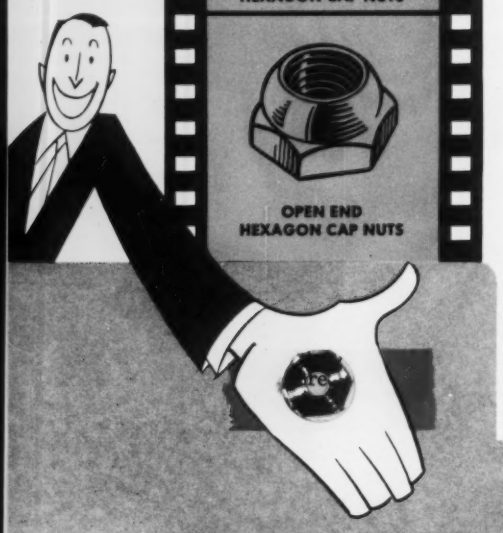
All nuts are *not* the same. The Fischer nut below is a precision product in spite of its thinness.

Like all Fischer brass and aluminum nuts . . . standards or "specials" . . . it was produced by *turning* on unique high-speed machinery. This process gives Fischer nuts an accuracy and uniformity which speed assembly operations and cut costs through faster starting . . . smoother, easier running . . . superior bearing surfaces . . . elimination of "blanks" or rejects.

Yet you pay no premium for this extra quality . . . Fischer *precision-turned* nuts cost no more than those produced by other, less accurate methods.

Specify "Fischer" on your next order. Prompt delivery is assured by large stocks of all standard types and sizes . . . "specials" are produced quickly and economically.





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The operator rides with the table as . . .

Turret Press Cuts Piercing Time

PRODUCTION stamping of complex hole patterns has been simplified and speeded up at Reliance Electric & Engineering Co., Cleveland.

The job is done with a 40-ton turret press built by Wiedemann Machine Co., Philadelphia.

Capacity—In stamping hole patterns in covers for operator's panels, the press will handle stock up to 60 in. wide and 100 in. long. For the flywheel drive, it uses a 3-hp Reliance motor which is totally protected.

The turret holds 22 tools at a time—they're preselected from a stock of 60. An automatic index control next to the operator's platform swings the turret, so any of the tools can be brought into work position as needed.

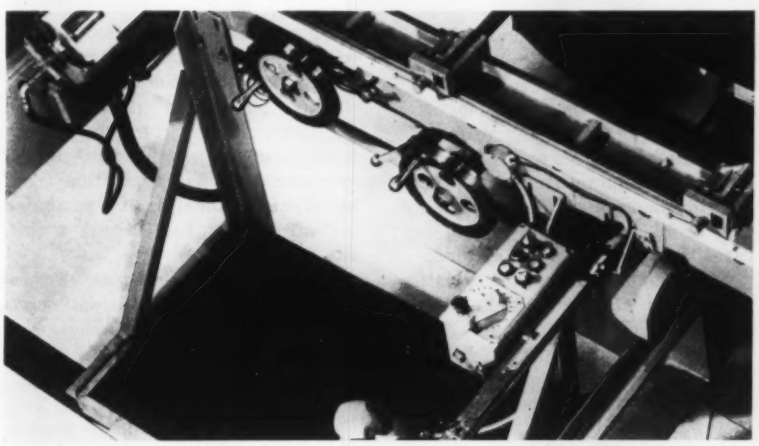
Operating a reversing servomotor, the dial control moves the turret over the shortest possible route to the tool, so it does not have to reposition to zero. The press will pierce holes as small as 0.093 in. and as large as 3 in. in ¼-in. plates. It will make 6-in. holes in ⅛-in. sheets.

Tooling—"Setup is a thing of the past," says W. J. Nemeth of Reliance's control division. The only setup involved is the selection and mounting of tools for the job. Since the turret holds 22 of them, tool change is infrequent.

After the operator has clamped the blank in position in front of him, the cycle is a routine process of dialing co-ordinates by manipulating two handwheels and firing the correct tool. The operator's platform and controls move with the table.

Pre-Planned — A converted accounting machine figures tool selection and plots co-ordinates of the holes. The machine also figures the forming loss factor into each new dimension to assure accuracy of hole placement after the parts are pierced and then formed.

Information from this process goes on a sheet of paper which acts as a road map for the press operator. One column of figures tells him the tool number for the operation. The other two give him X and Y co-ordinate readings. The only variable in the process is the operator's skill in dialing.



Controls are grouped around the operator's platform. Left to right: Drum holder for the instruction chart, crossmotion handwheel and lock, in-and-out lock and wheel, and the preselector for turret positioning

These stamped covers illustrate the complex hole patterns that are coming off the press. The whole job is done in one operation

End Use of Reinforced Plastics in 1956

Aircraft	20 per cent
Construction (including plain and corrugated sheeting)	16 per cent
Boats (both all reinforced and as outer skin on wooden hulls)	16 per cent
Consumer products (fishing rods, luggage, sleds)	10 per cent
Automotive	8 per cent
Containers, trays, tanks	5 per cent
Appliances (laundry tubs, appliance housings, refrigerator liners, etc.)	5 per cent
Miscellaneous	20 per cent

REINFORCED PLASTICS:

A Challenge to Metals

There are many products where they can do a good job and reduce costs without cutting quality. Their properties can't be duplicated by any other material

CLOSE to 70,000 tons of reinforced plastics were consumed in the U.S. during 1956. This represents a 30 per cent gain for the industry over 1955.

Equal growth is expected this year. The number of structural and semistructural applications in building and in all forms of transportation is steadily increasing.

Autos—Reinforced plastics' growth in the auto industry is in components—heater and air conditioner housings, instrument panels, fender fins, trim panels and "hardtops." One auto maker has tooled to produce dash panels of reinforced plastics for all his cars.

All the big companies are using them for some body parts. Chrysler Corp. uses the material for motor fans and for parts of its automatic transmissions.

Aircraft—As the speeds of aircraft and missiles approach the thermal limit of current materials, aircraft manufacturers are turning to plastics to solve some of the problems of high-heat input rates, temperatures, air erosion.

The chief reason that plastics have been able to withstand extreme temperatures for short periods is the high specific heat of the resins. In some places, this material is being used to protect metals.

Materials—The most commonly used plastics for high-temperature use are the phenolic resins reinforced with glass, asbestos and refractories. The reinforcement depends on the application and the required results.

Silicone resins are showing increasing possibilities because of new curing methods. They have been used with both glass and asbestos.

Epoxies—Some of the new high-temperature epoxy resins have higher physical properties and the ability to take great temperature shock.

The polyesters have been used where electrical transmission is required through parts that are subject to high temperatures.

Many applications have proved satisfactory in the 4000 to 5000° F range. Typical parts are fins, motor liners, control surfaces, guiding vanes and heat barriers. These parts have been exposed up to 1 minute at erosion velocities equivalent to Mach 4 and 5.

Honeycombs—Uses of reinforced plastics honeycombs are growing in the commercial and aircraft fields.

In commercial applications, desirable architectural effects can be obtained by facing the honeycomb cores with glass, plastics-coated aluminum and porcelain enameled aluminum and steel.

In aircraft honeycomb, most common facing materials are aluminum and stainless steel sheets.

Sandwich Wings—Typical uses are in aircraft and missile wings and tail assemblies. In one application, the upper and lower surfaces of an aircraft wing are formed from separate sandwiches. Each consists of aluminum facings with a heat-resistant, glass-fabric-reinforced honeycomb core.

The honeycomb provides the necessary stability to the aluminum facings for structural integrity and sufficient insulation from aerodynamic heating to minimize boil-off of the fuel stored within the wing.

In some missile designs, the entire wing cavity is filled with honeycomb; the complete wing is a single sandwich.

Plastics Bottle—Spherical bottles for high pressure air in aircraft have been made of heat treated steel for many years. A bottle 12 in. in diameter, designed for service at 3000 psi, will weigh about

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Minimum Distortion— Strain-Tempered Steels reduce warpage in machining, saving costly straightening operations.

Wearability-Strain-Tempered Steels offer you, in most applications, adequate wearability without further costly heat treating operations.

Savings— Strain-Tempered Steels reduce your cost by elimination of lost production due to cracking and distortion caused by quench-and-temper heat treatments.

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281 E. 155th St., Dept. 53
Harvey, Ill.

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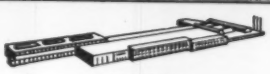

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Up she goes in a happy swoop—because this spiral indicates the *inflated machine tool output* you can achieve with a little judicious investigation—today.

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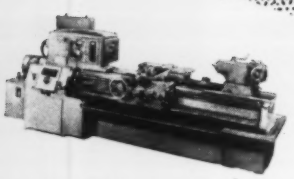

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THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

REINFORCED PLASTICS . . .

32 lb. When loaded with 3000 psi air, it will shatter if a 50-caliber, armor-piercing shell is fired into it.

Apex Electrical Mfg. Co., Cleveland, is making the bottle in reinforced polyester plastics. It weighs 16 lb. Minimum burst pressure is 6667 psi. It has a minimum life of 10,000 cycles—0 to 3000 to 0 psi. A 50-caliber armor-piercing shell fired into a loaded bottle will not shatter it.

Register Housing—Less spectacular is the new reinforced glass fiber polyester cash register housing being used by Victor Adding Machine Corp., Chicago.

It's supplied by Camfield Fiberglass Plastics Inc., Zeeland, Mich., in a textured finish ready for installation on the machine.

How It's Made—The making of a reinforced plastics product usually starts by saturation of the reinforcing material with a liquid or viscous resin. The two components are put together in various proportions and may be molded or laminated by a variety of processes and with various types of dies, presses and other equipment.

Chemical catalysts added to the resins induce hardening or "cure" within a predetermined time cycle. Reinforcing material may be chopped fibers, a porous mat or woven fabric.

Properties — Products made of reinforced plastics compete successfully with those of other materials on the basis of their high strength with low weight, great impact resistance and dimensional stability and their ability to maintain molded size and shape under stress and temperature extremes.

They resist weathering and rot, deteriorating influences of fresh and salt water, chemicals, acids, oil and solvents. Having low thermal conductivity, they often provide insulating value.

Not Substitutes — Reinforced plastics are not substitutes for other materials. They have a combination of properties present in no other material. In products where they have replaced other materials, manufacturers have applied those properties to serve functions no other material could fulfill adequately, to do a better job than any other material, or

add Bearings, Inc. engineering service to a good idea . . . get a better product!

A prominent manufacturer of electrical motors uses 110 of these flyer assembly spindles to wrap insulating wire. They worked fine — much better than old type spindles but the life of the bearings averaged only one to two weeks per unit. This caused serious delays in production and an excessive bearing replacement cost.

Bearings, Inc. engineers were given the problem. All spindles were shipped to our complete Spindle Repair Department in Cleveland. The housings and shafts were reworked to accommodate a machine tool precision bearing with proper clearances and preloads to meet the most rigorous service demands.

Within a short time these spindles were back in service, operating at higher speeds than had been possible before. They wind evenly with uniform tension, wire breakage is eliminated and the bearings are giving exceptional service life.

Do you have a bearing problem? Want replacement bearings in a hurry? Ask our branch nearest you for *any* service involving bearings — they're ready NOW to help you!

Rendering bearing service in the territories adjacent to our branches, listed below.

BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
DELAWARE: Wilmington •
Subsidiaries: Balanrol Corp. • Buffalo, N.Y.• Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

Handling Costs Are Lower When the Crane is a Bucyrus-Erie

On material handling jobs, the speed of Bucyrus-Erie crawler-mounted cranes brings you savings all down the line. Here's how:

Independent boom hoist permits quick boom-angle changes. Direct-connected "full feel" controls respond instantly to help the operator "inch" loads up or down . . . quickly.

Low center of gravity and long, wide-spread crawler units assure maximum stability and firm footing . . . enable operator to work rapidly and to handle long booms with ease.

For extra speed and convenience, jib extensions can be connected without removing sheaves, guards, suspension ropes, or any of the boom-point machinery.

This is just a sample of the advantages Bucyrus-Erie cranes offer. See your nearby Bucyrus-Erie distributor soon, and find out how these machines can cut YOUR handling costs.

249E56

Bonus Quality For chemical analysis of steel and other materials, Bucyrus-Erie's laboratory has the finest scientific equipment, including the *spectrophotometer* shown here. This apparatus analyzes the elements in steel by measuring the degree to which a steel solution absorbs certain waves of light. Both the presence of elements and their exact quantities can be determined by this extremely sensitive instrument.

BUCYRUS ERIE SOUTH MILWAUKEE, WISCONSIN

REINFORCED PLASTICS . . .

to cut costs without reducing quality.

Thousands of tote trays, boxes and other containers have been produced from reinforced plastics. They range from small table containers to 1000-gallon trailer truck units.

Plastic Pipe — Reinforced plastics are used as pipe for petroleum products, fresh and salt water, other corrosive liquids, and as stacks for discharging corrosive fumes from manufacturing processes.

Officials of the Fibercast Corp., Sand Springs, Okla., a subsidiary of Youngstown Sheet & Tube, say their glass fiber reinforced epoxy pipe can be used above 220°F or 1000 psi. Data on Minnesota Mining & Mfg. Co.'s glass filament reinforced epoxy pipe show that the pipe can take continuous service at 1000 psi at temperatures from − 65 to 150°F.

Electrical—Plastics laminates in electrical equipment have good mechanical properties, perform well under extreme conditions of heat and humidity and extend the service life of the equipment. Uses include toggles, levers, instrument panel boards, printed circuits and slot wedges in motors and generators.

Sportsmen are well acquainted with reinforced plastics. They go into boats, fishing rods, tackle boxes, skis, bows and other sports gear. About 16 million plastics fishing rods are in use, with nearly 50 companies producing them.

Boats—Close to 22 million lb of reinforced plastics went into boats and boat accessories in 1956 for both military and civilian uses—protective hull coverings and as hulls made entirely from the material.

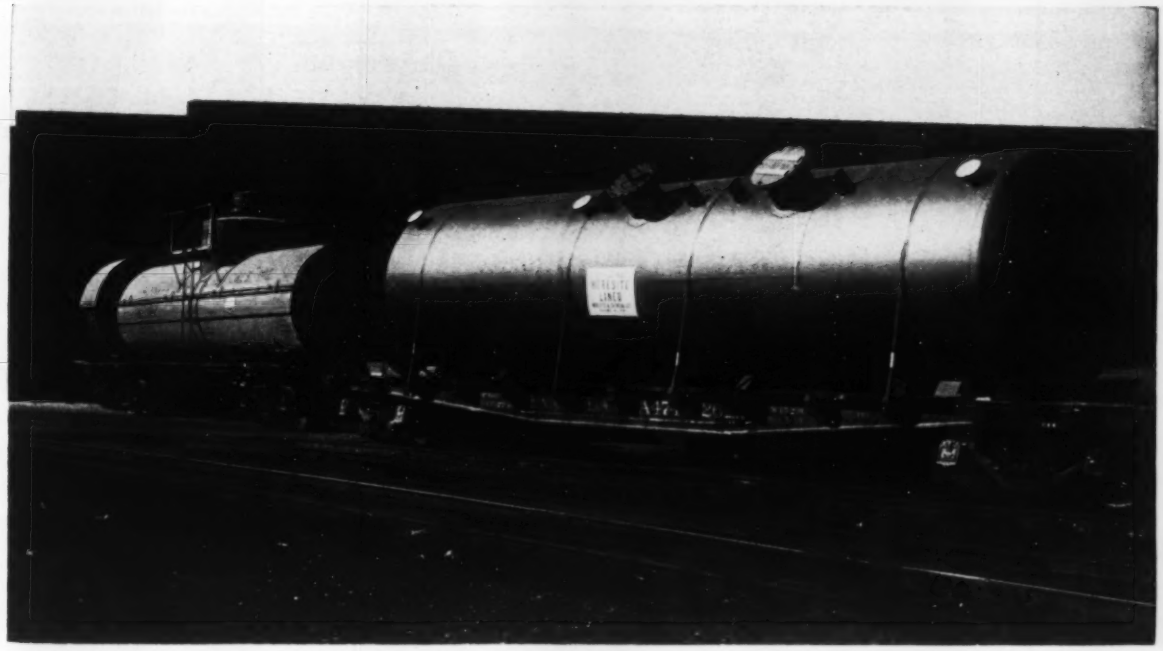
An estimated 40,000 glass fiber reinforced plastics boats were sold in 1956, compared with 5000 in 1950. The most talked about advantage is minimum maintenance. Owners are freed from seam calking and seasonal painting. Plastics resist weather and water exposure deterioration and are impervious to worms and dry rot.

Styling and appearance are big factors. Since they can be formed to any shape, reinforced plastics hulls can be designed for maximum

HERESITE

REG. U. S. PAT. OFFICE

LININGS FOR TANK CARS AND STEEL TANKS



EASE OF CLEANING Steel tanks and tank cars — HERESITE lined — are quickly cleaned by steaming, hot water, or any type of solvent wash.

RESISTANCE HERESITE linings prevent contamination of sulphuric acid, rubber latex, formaldehyde, battery acid, lactic acid, acetic acid, fruit juices, wines and many more products. Arrival at destination-unchanged, fresh and full strength.

FABRICATION Steel tanks built to your specifications at Manitowoc, Wisconsin are HERESITE lined—then shipped directly to destination. Saves you time, shipping costs, and production problems.

May we have your inquiry? Catalog No. 57 mailed if requested on your letterhead.

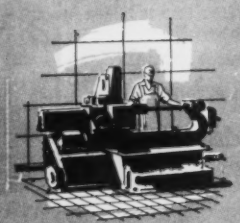
HERESITE & CHEMICAL COMPANY

MAIN OFFICE & PLANT—MANITOWOC, WISCONSIN

EASTERN DIVISION—GARWOOD, NEW JERSEY

A complete line of Roller Bearings . . .

For every field of transportation and industry

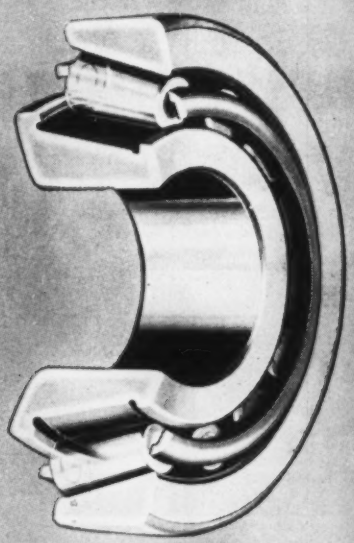


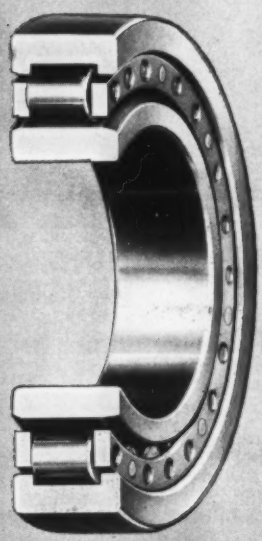
Job-tailored in a wide range of sizes to fit your specific needs

Aircraft? Automobiles? Earth-moving or farm equipment? *Whatever* you make, if your product uses straight or tapered roller bearings, Bower can meet your specifications *exactly*. For dependable Bower bearings are virtually custom-built to the job . . . engineered and sized to match any requirement.

Important, too, are exclusive Bower design features that assure long life, top performance, *less maintenance*. And when you specify Bower bearings you can always be certain of the highest quality materials and workmanship. These reasons, of course, are why Bower straight, tapered and journal roller bearings are used by leading manufacturers everywhere—for any application.

Let a Bower engineer give you full details of the complete Bower line. Call him in while your product is still in the design stage.





SPHERO-HONED

BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION • *FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICH.*

performance. Their method of production also makes time and labor savings possible.

Structural Sheets—The largest single use for reinforced plastics is structural sheet material, in corrugated or flat form, and with a choice of colors molded in. Translucent and clear sheet materials are used for screens and partitions in offices, homes, stores and many other places.

In home appliance construction, reinforced plastics are easy to find. Westinghouse's new built-in refrigerator is made from a single sheet of sandwich material combining reinforced plastics, styrene foam insulation and styrene alloy.

Economies—In a new window unit air conditioner, six reinforced plastics parts in the housing, base plate and related components replace 24 of metal. This affords substantial reductions in tooling, labor and assembly costs. Weight per unit is reduced 20 lb. The plastics also provide a weather-resistant outside surface and cuts down operating noise.

A washing machine manufacturer designed a spiral-bladed agitator to give his new model 30 per cent greater washing efficiency and was able to produce the part in two pieces, compared with 22 which would have been needed in metal.

A significant development by and for the auto industry has been the introduction of reinforced plastics dies tough enough to form cold rolled and stainless steel.

Plastics Houses—Someday we may be living in reinforced plastics houses. A plastics home of the future has been developed by three professors at Massachusetts Institute of Technology, in a project sponsored by Monsanto Chemical Co.

It is cross shaped, consisting of a core with four wings. In the core are grouped the utilities, including the baths, kitchen, laundry space and other working areas. The living, dining and sleeping quarters are in the four wings.

The plan leads to a small, compact foundation concentrated under the central core with the wings cantilevered from it.

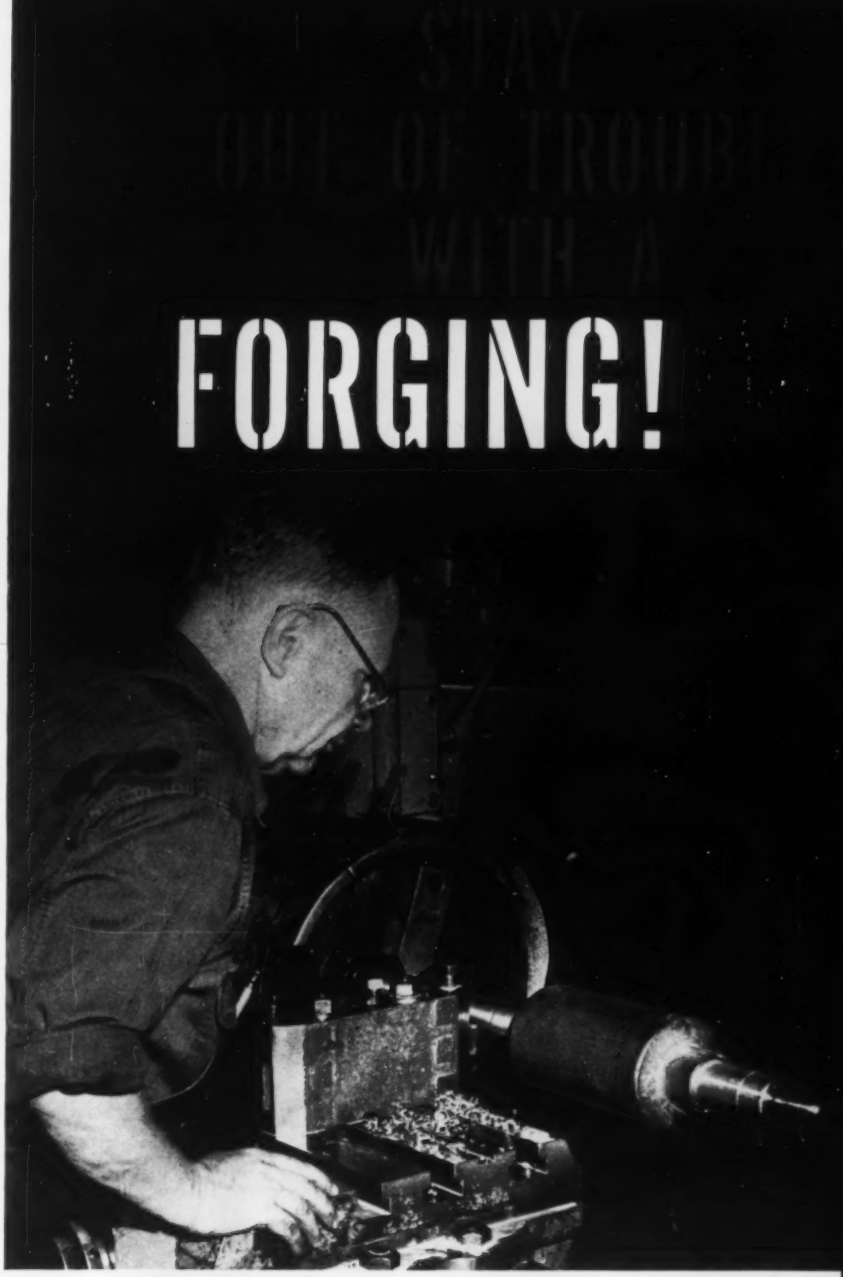


PHOTO - COURTESY CLEVELAND WORM AND GEAR CO.

The part illustrated above *will* become a component of the completed product — will *not* become a reject — BECAUSE IT IS A FORGING.

You get effective machinability because forgings are dense, homogenous metal, free of porosity and other flaws. Forgings start with *forging quality metal* which is improved by the forging process. This fact also offers advantages in heat treating and welding.

If you are experiencing a costly reject rate, find out how *forgings will help you.* Call in a forging engineer, and also send for the booklets offered below to learn the economies that can be gained by the use of forgings in your product.

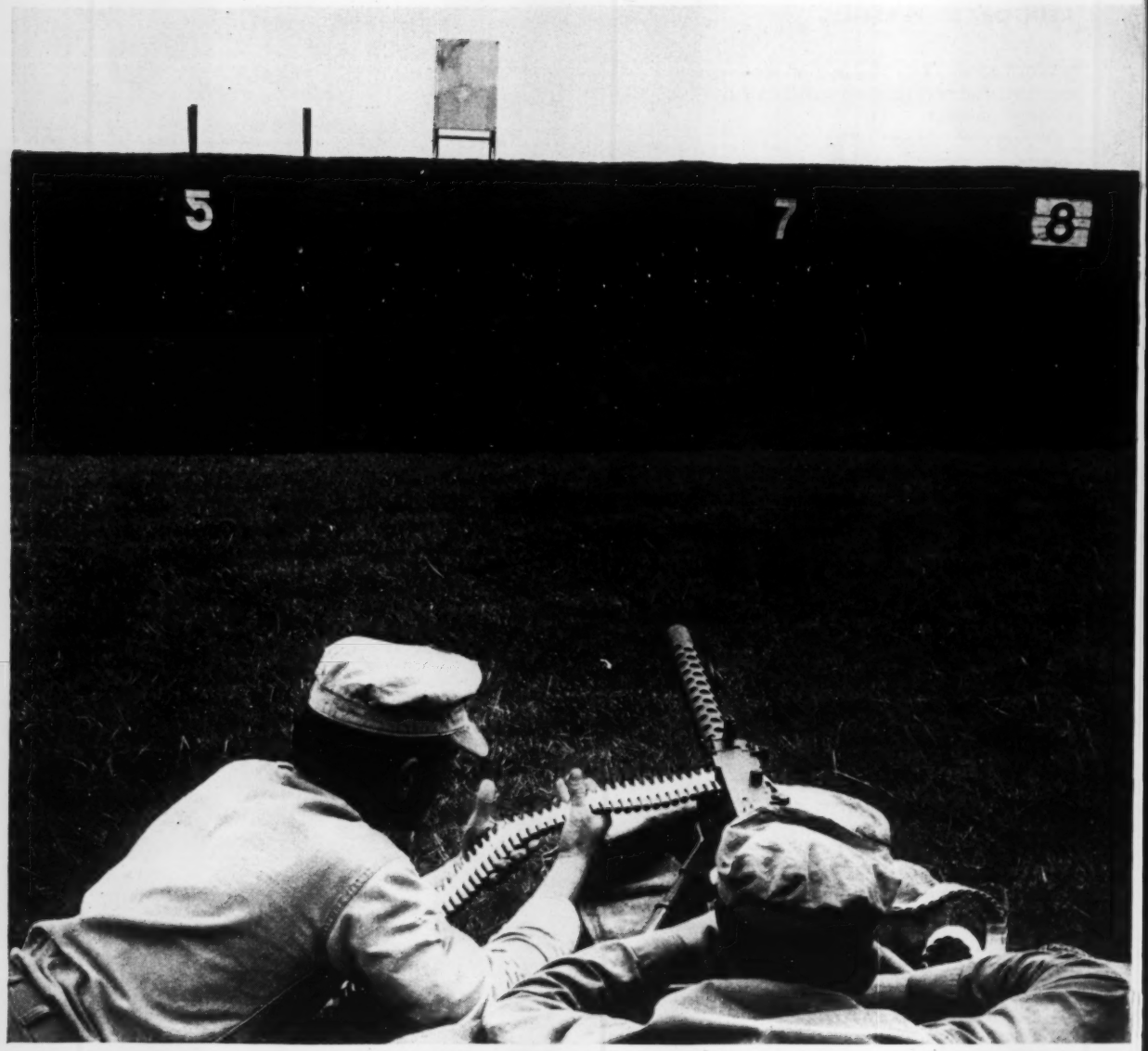
Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

closed-die **forgings** for metal you can trust

DROP FORGING ASSOCIATION

Dept. S, 419 S. Walnut St., Lansing, Mich.

Symbolic emblem of the Drop Forging Association



LEATHERNECKS FAIL TO FLAKE TI-CO®

Close-up inspection of the bullet holes in TI-CO. Not one sign of coating failure.

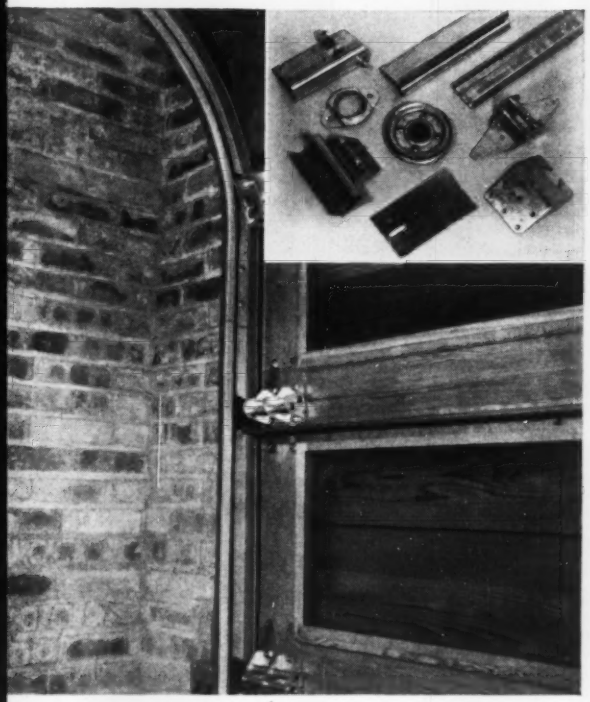
Two husky Marines teamed up with a Browning .30 caliber machine gun to pour two hundred rounds of armor-piercing ammunition into a sheet of Inland TI-CO galvanized steel.

Despite the smashing contact of slug after slug, TI-CO showed not a crack, not a chip, not a trace of peeling or flaking. The protective zinc coating on TI-CO stayed put... to the very edge of the holes.

If speeding bullets fail to flake TI-CO... you can be sure that even the most severe fabricating operations or the roughest, toughest handling will not flake TI-CO's coating. That means positive protection for the base metal. No chance for rust to get a foothold.

Switch to TI-CO galvanized sheets save manufacturers up to 15%

TI-CO eliminates re-dipping . . . painting . . . plating and improves saleability of products



1. Well-known garage door manufacturer reports cost-savings of more than 10% when they eliminated plating operations on hardware by changing over to TI-CO galvanized sheets. Change resulted in a good looking, more durable product, too.

2. Previously, this roller gravity conveyor was made from hot rolled sheets and then it was either zinc-dipped or painted. Now, it's fabricated from TI-CO and the costs of dipping and painting have been removed. Non-flaking TI-CO also adds important sales feature of positive insurance against corrosion.

3. Leading furnace manufacturer saves $20.00 per thousand, or approximately 15% of total costs, on the production of this plenum take-off since he switched from cold rolled sheets to TI-CO.

TI-CO takes the tough 4-inch draw in stride with no flaking of the protective zinc coating. Cleaning and painting of product after forming have been eliminated.

Wherever corrosion resistance is a requisite in a product, non-flaking Inland TI-CO galvanized sheets offer important advantages to the manufacturer in reduction of costs and in product improvement. This is because TI-CO can take any fabricating operation that can be performed on cold rolled steel without flaking of the zinc coating.

If you are presently manufacturing or designing a product in which corrosion resistance is a factor, it will pay you to investigate TI-CO galvanized sheets.

TI-CO is manufactured in coils and cut lengths with oiled or chemically treated surfaces. For complete information, consult your local steel distributor or Inland sales representative.

Write today for a free informative booklet on TI-CO to:

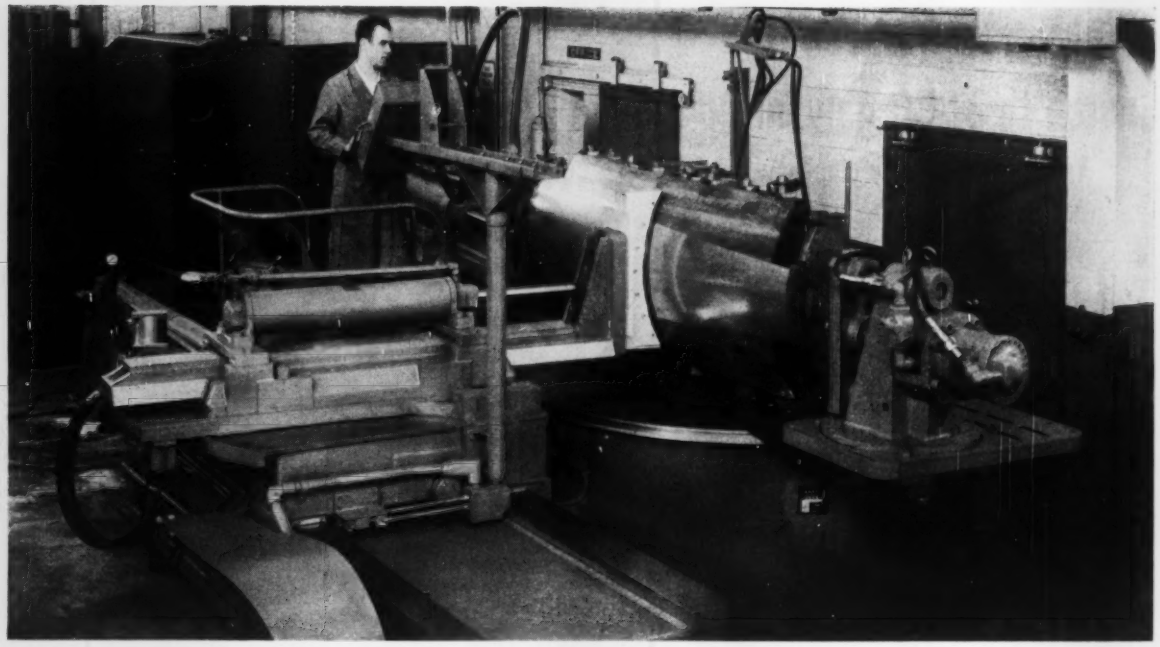
INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport
St. Louis • Kansas City • Indianapolis • Detroit • New York

INLAND TI-CO ®

look for this brand—
your assurance of
non-flaking performance



The operator rides a traverse compression unit as the wipe shoes iron a tapered metal shape being stretch formed at the same time

Stretch Press Works Two Ways

PROBLEM: You can't stretch form pretapered metal parts because you'll overstress the lighter cross sectional areas. Yet you don't want to have to machine the taper after it's contoured because it is too costly.

Case study: Engineers at Cyril Bath Co., Solon, O., were asked to produce long metal parts to a contour that could taper from end to end or vary in cross-sectional area.

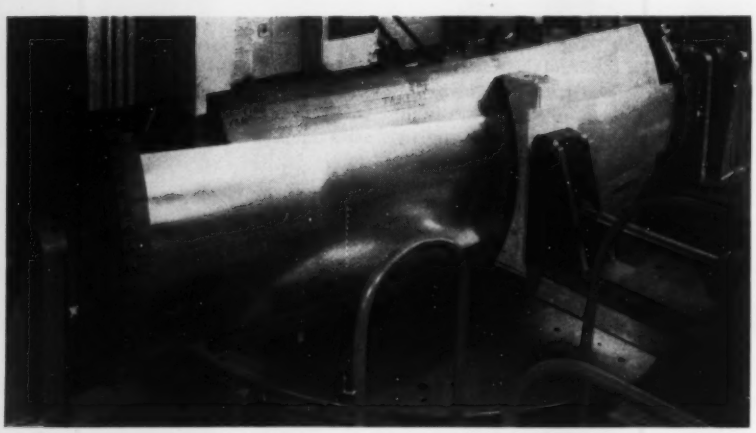
Solution: They turned up some new techniques in the art of draw forming, using a conventional machine that has a tension cylinder with a rotary table and contour die.

Alongside, however, a traverse compression unit sends in a hydraulic ram with wipe shoes that iron the material to the face of the contour die.

Two Ways—With one technique, the machine stretch forms the contour at tonnages suitable to the lighter cross sections. At the same time the ram unit puts pressure at the point of tangency of the material and the die. It progressively increases pressure to form the heavier sections. Stretch and compression methods work simultaneously.

A second technique uses the hydraulic ram as an additional gripper. The lighter section of the piece is first set to contour with suitable tonnage. The ram shoe is then put on the material part way along the contour and forced against the sheet and die to act as a gripper.

Stretch tonnages then may be increased to set the heavier areas of the piece. With long parts, this relocation of the holding shoe and increase in stretch tonnage may be repeated several times to get the desired form.



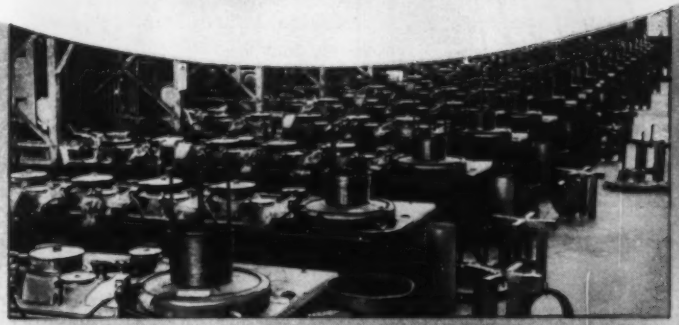
Close-up shows how metal (24S-0 aluminum here) is pulled across the contour die and simultaneously ironed by the wipe shoes

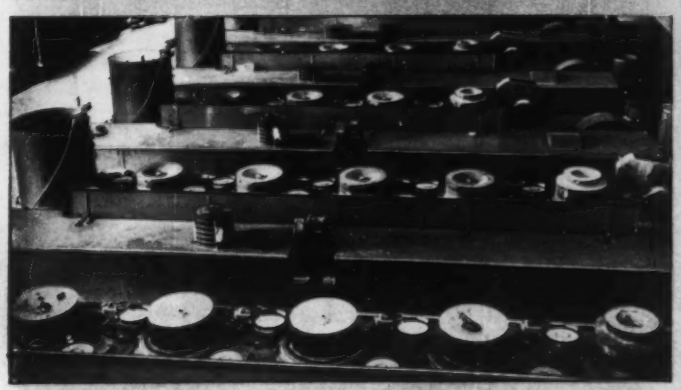
CONTROLLED SPEED
DOUBLE COOLING

NO SLIP
NO STORAGE
NO TWIST

-Better Wire!

VAUGHN® MOTOBLOX®





Every advantage of Vaughn's top technology in wire drawing, combined with the experience of a century in building ever-finer machines for the job, serve you in reducing costs and increasing wire production. Specify MOTOBLOX—we'll gladly consult on types and capacities, at your convenience.

"Quick on the Draw!"

The VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

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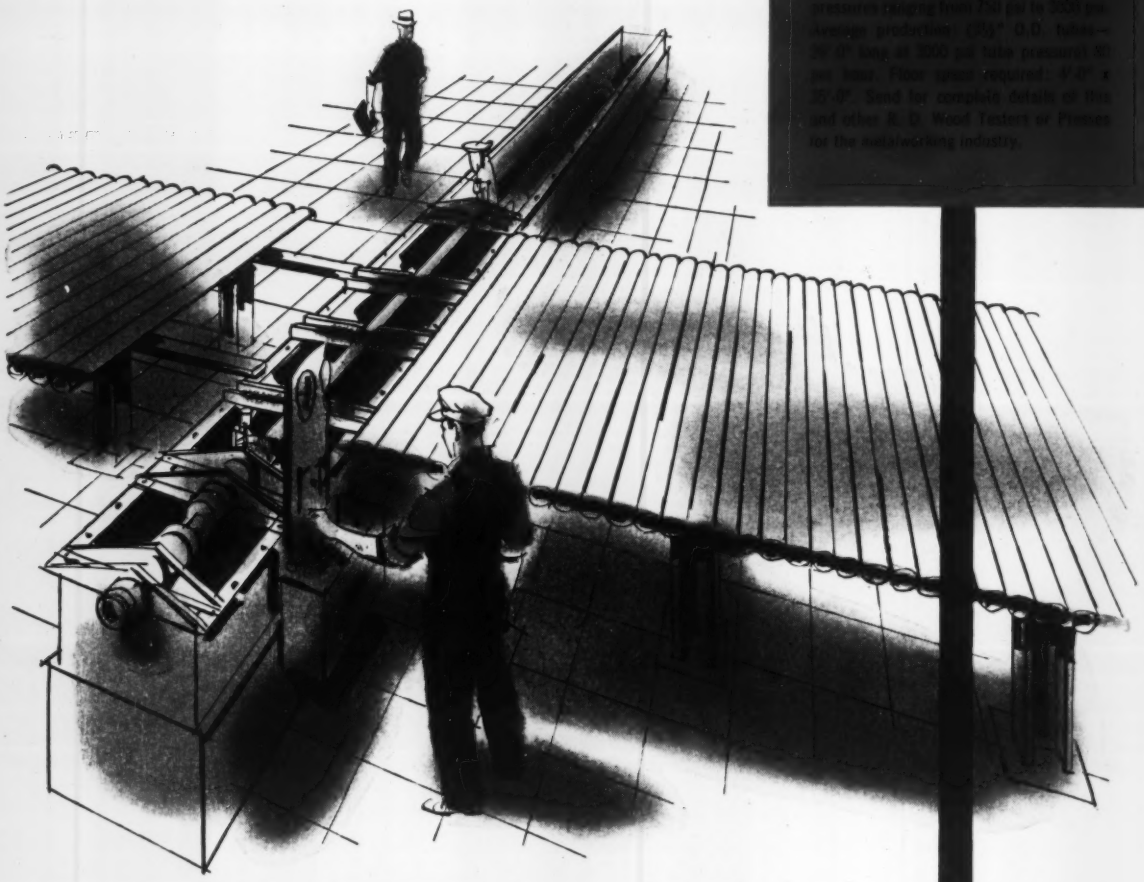
Engineered for Performance

Put a Wood Tube Tester to work and get the money-saving advantages of smooth, dependable performance . . . long operation with low maintenance.

Reason: every Wood Tube Tester is the product of sound design, carefully selected materials, conscientious craftsmanship. This is why Wood Tube Testers and Presses are known throughout industry for their trouble-free operation and fast, economical production. R. D. Wood has many standard tube tester and press designs for a great variety of uses—and engineers others for special work. Write for our catalog and engineering information. No obligation, of course.

R. D. Wood Tube Tester for hydrostatically testing tubes or pipe in sizes from 1" to 3" O.D., lengths from 10'-0" to 25'-0", at test pressures ranging from 750 psi to 3000 psi. Average production: 2½" O.D. tubes—20'-0" long at 3000 psi tube pressure 90 per hour. Floor space required: 4'-0" x 35'-0". Send for complete details of this and other R. D. Wood Testers or Presses for the metalworking industry.



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Testing Quality Of Spring Steel

Hardness isn't the only test. Alone, it may cause unnecessary rejections or allow inferior material to be accepted

By WILLIAM R. JOHNSON
Metallurgist
Wallace Barnes Co.
Division of Associated Spring Corp.
Bristol, Conn.

GENERALLY, pretempered steel must be used to meet the hardness specification of springs. This property can be measured with a standard hardness tester.

But, frequently, hardness indicates only part of the steel's pertinent properties. Seldom does this test alone give a sufficient index to the spring-making qualifications of the material.

Wallace Barnes Co. Division of Associated Spring Corp., Bristol, Conn., has devised special tests to determine the particular properties of tempered steel that makes it suitable for springs.

Hardness Processing

Pretempered spring steel is hardened by passing it continuously through a hardening furnace, a quenching bath and a tempering furnace. The material usually is carbon steel of SAE 1075 or 1095 analysis. Final properties of the pretempered material depend to a large extent on the particular hardening treatment it receives.

Treatments—Austenitizing heat may be applied in molten lead or in a reducing atmosphere. The strip may be quenched in molten lead, oil or in cooling blocks. Tempering may be done in molten lead or in controlled atmosphere.

Strip quenched in molten lead will have a slightly austempered structure containing some bainite in addition to the tempered martensite. It will be more ductile and tougher than strip quenched in oil or in cooled blocks, and it has a lower elastic limit. Lead-quenched stock can be used at a higher hardness level (about 2½-points Rockwell C higher) than oil-quenched stock that has the

Abrasive Cutting | *the best way to cut many materials* / *the only way to cut some*

Allison Cut-Off Wheels

Wide variety of shapes and materials cut with abrasive wheels

• Speed and quality of cut make abrasive cutting ideal for a wide range of operations. For example: one inch diameter cold rolled steel can be cut with a wheel cost of under ½ cent per cut and in 3 seconds.

ALLISON Cut-Off Wheels can provide smooth, high-quality cutting for almost any type of material however hard. These include steels of practically all analyses including corrosion-resisting types, brass, bronze, Monel Metal and other non-ferrous: aluminum alloy, magnesium and many others.

Whatever the problem there is an Allison Wheel to meet it . . .

Profitable abrasive cutting means using the right abrasive wheel . . . and the proper abrasive cut-off machine . . . for the specific job. If the required result is a smooth, fine finish, without hardening or metallurgical changes, a WET cut is called for. Rubber bonded ALLISON Wheels give long wheel life and high quality cuts for such an operation. If the cut is a big one (over 2" solid) an OSCILLATING Cut-Off machine . . . with the proper ALLISON Wheel . . . will do the job fast and economically. Where quality requirements are less exacting, dry cutting with ALLISON resinoid bonded wheels is often the best method.

Allison
ABRASIVE CUTTING WHEELS

Consult a specialist for best results

• ALLISON specializes in the manufacture of abrasive cut-off wheels. Be sure that you are getting the most from your cutting methods. Abrasive wheel cutting is faster than sawing—in some cases it is 10 to 20 times as fast. The savings in cost can be tremendous. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

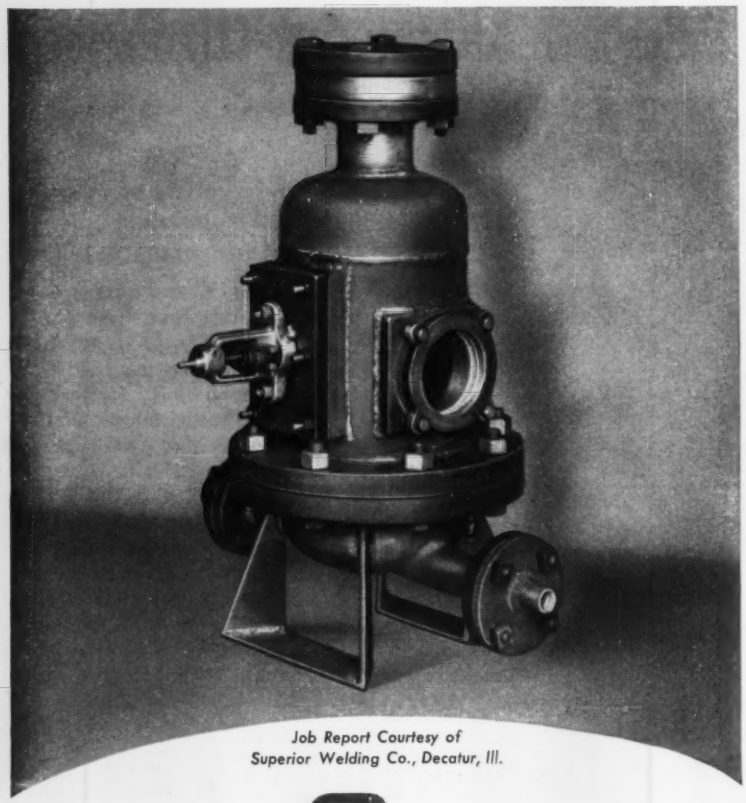
ACCO
TRADE MARK

Send for Booklet "ABRASIVE CUTTING" Today

ALLISON DIVISION
AMERICAN CHAIN & CABLE

254-B Island Brook Avenue, Bridgeport 8, Conn.

For MORE DEPENDABLE Results When Welding Stainless and Dissimilar Metals

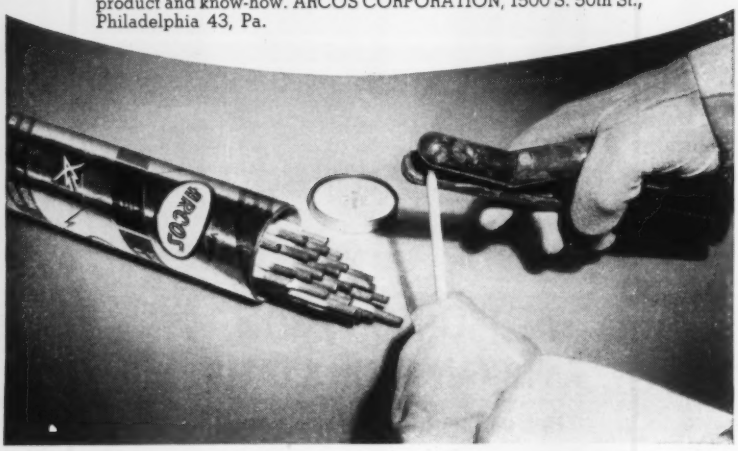


Job Report Courtesy of
Superior Welding Co., Decatur, Ill.

WELD WITH ARCOS

STAINLESS ELECTRODES

This sight flow box is used to check the condition and flow of process chemicals. To assure sound weldments when joining the carbon steel flanges (stainless faced) to the type 316 stainless unit, Arcos 25-20 Mo Electrodes were used. Because of the analysis and uniform ductility of this weld metal, it readily compensated for the unequal rates of contraction of the dissimilar metals. Arcos KMo Electrodes were used to complete the application. Whatever your job, your Arcos representative will have the answer with the right product and know-how. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.



TESTING SPRINGS . . .

same toughness, formability and elastic limit.

Set Point Test

It is important to many customers to know what load can be applied to a part blanked from tempered spring steel so there will be no permanent change in dimensions after the load has been removed. This stress level might be called the elastic limit in bending, or the set point.

Bending—The set point test devised by Wallace Barnes is sensitive to the condition of the surface layers of the steel. It is applied by bending the stock around an arbor (rather than applying tension), releasing it and measuring the amount of permanent set. A specimen 2 in. long is used.

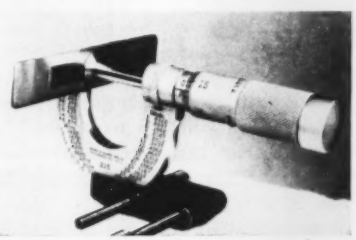
The specimen is bent around arbors of successively smaller diameter and a plot is made of the arc height (permanent set) against the diameter of the arbor for each deflection. The set point is arbitrarily taken as the point where the arc height after release is equal to 2 per cent of the deflection under load.

Measuring — The arc height is measured by a modified micrometer whose fixed anvil has been extended to accommodate the 2-in. specimen. The bowed specimen is held in place by the two anvils of the micrometer and the movable anvil retracted until the specimen drops from between them.

Fatigue Test

Most flat spring applications call for the material to be stressed by bending in one direction only. The Wallace Barnes fatigue tester duplicates this service condition.

Cycled—The test specimen is a flat sample of the stock as finished. It is clamped in a fixed



For the set point test, this modified micrometer measures arc height of specimen before and after deflection

holder as a cantilever beam, and one end is deflected by the rotation of an eccentric disc mounted on a motor shaft. Eight specimens can be tested at one time.

The amount of deflection given to each specimen is constant, but the stress can be varied from zero to a maximum level by altering the length of the cantilever span (adjusting the position of the specimen holders). A shaft revolution countermeasures the number of bends which each specimen can endure before fatigue failure.

Endurance Limit — Of all the strip steel specimens that failed in this tester, over 95 per cent did so in less than 200,000 cycles. Chances are that a specimen which does not fail within 200,000 cycles will run indefinitely.

By using this 200,000 cycle life as the endurance limit for the spring steel, the time required to test the fatigue resistance can be reduced to a reasonable level.

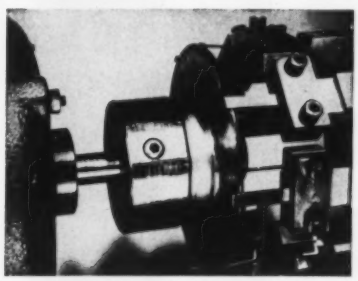
Break Test

A strip of pretempered material is bent into a "U" in the jaws of a vise until it breaks. The "break distance" is the size of the opening between the jaws of the vise at the moment of fracture.

Breaks — A "brittle break" or "high break" (a fairly large jaw opening) may indicate a lack of ductility due to improper hardening. A "low break" may mean that the steel is too soft or is partially decarburized.

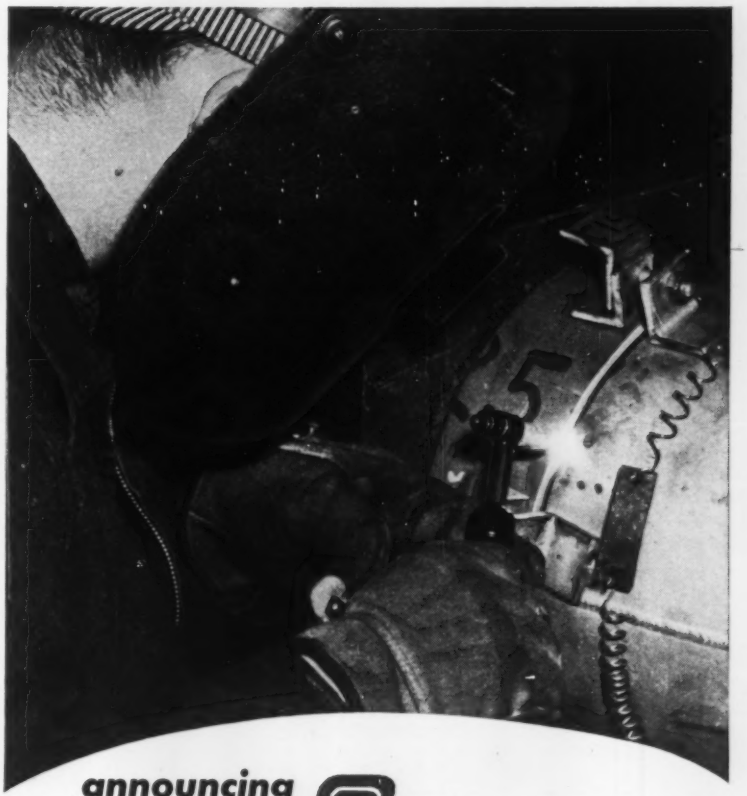
An excessively brittle break could mean that springs made of that steel would be likely to fail prematurely. Spring steel with a low break point might have a low torque or low elastic limit.

Old Test—This is a formalized



Rotating eccentric disc in fatigue tester bends specimens in one direction, duplicating service conditions

NEW PROCESS
assures improved pipe welds



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EB* WELD INSERT

To meet modern requirements for better pipe welds where high temperature, high pressure, and corrosive conditions exist, Arcos now offers the Consumable Weld Insert. Used for making the root pass, the EB Insert assures sound crevice free welds with smooth uniform inside contours. Saves money and time in fabrication . . . minimizes turbulence, and promotes trouble free service. Write for details. ARCOS CORPORATION, 1500 S. 50th St., Philadelphia 43, Pa.

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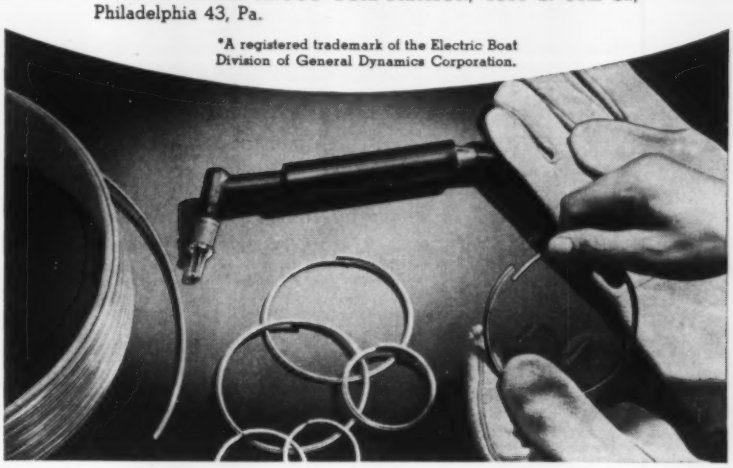

Simple Design Changes Permit
STANDARD RIVETS
to Replace Costly "Specials"

We produce a wide variety of special fasteners for our customers . . . but only when we *have to!* Only when a *standard* rivet just won't fit the application. We bring our experience, skill and engineering know-how to every job, large or small. It's a challenge to see if we can't modify designs to substitute an inexpensive "standard" rivet for a more costly "special".

To improve product appearance and strength
. . . to take full advantage of automatic assembly
. . . to cut delivery time and production costs
—get in touch with Milford first!

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MILFORD RIVET & MACHINE CO.
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TESTING SPRINGS . . .

version of the spring craftsman's practice of testing steel by snapping it between the fingers. It was used many years to determine the suitability of steel for clock springs.

Formability

By bending a sample of stock into a "U" in a vise to a point just short of fracture and observing the radius of the bend that remains when the load is released, the springmaker gets an indication of the approximate minimum radius to which the stock can be formed by conventional techniques.

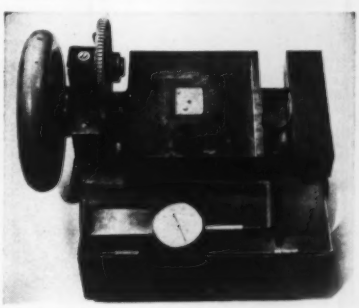
Punch and Die—A more exact measure of the basic forming property can be obtained by U-bending samples of stock in a simple bottomless die with a punch of known diameter.

Clearance between the punch and die is maintained at the equivalent of one stock thickness on either side of the punch. The smallest diameter punch which will make a 90-degree bend in the stock without fracture is a measure of the ductility and formability of the steel.

Other Tests

For general quality control, hardness and microstructure tests are still useful. For the thinner gages of material (below 0.010 in.), it is important that hardness testing be done on the proper instrument, such as the Tukon or Vickers tester.

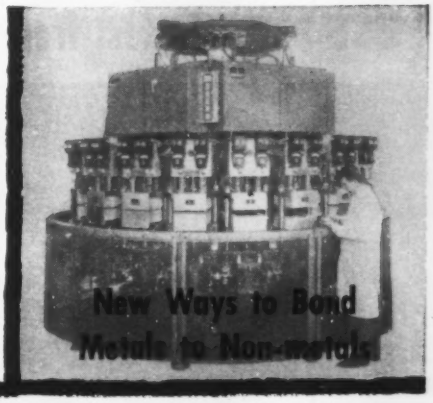
The microstructure of each lot of tempered stock must be checked to make sure that no decarburization, oxidation of the grain boundaries or improper heat treatment has taken place.



Wallace Barnes bends strip into a "U" in vise jaws to determine break point. Vise also tests formability of strip

New Assembling Methods & Machines

New fast functional chamfering of almost any kind of part



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Complete Deburring & Chamfering

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For all kinds of innovations in

New Machines to Cut Your Costs

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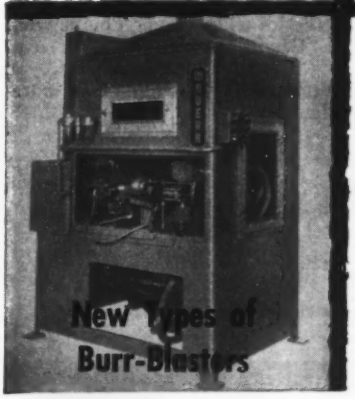
Positive deburring of any toothed part at 5 teeth/second

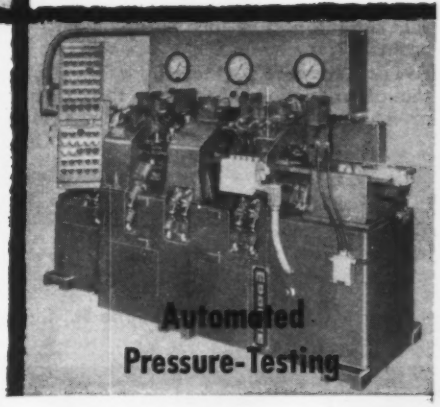
All Kinds of Multi-station Machines

Positive deburring of non-toothed parts



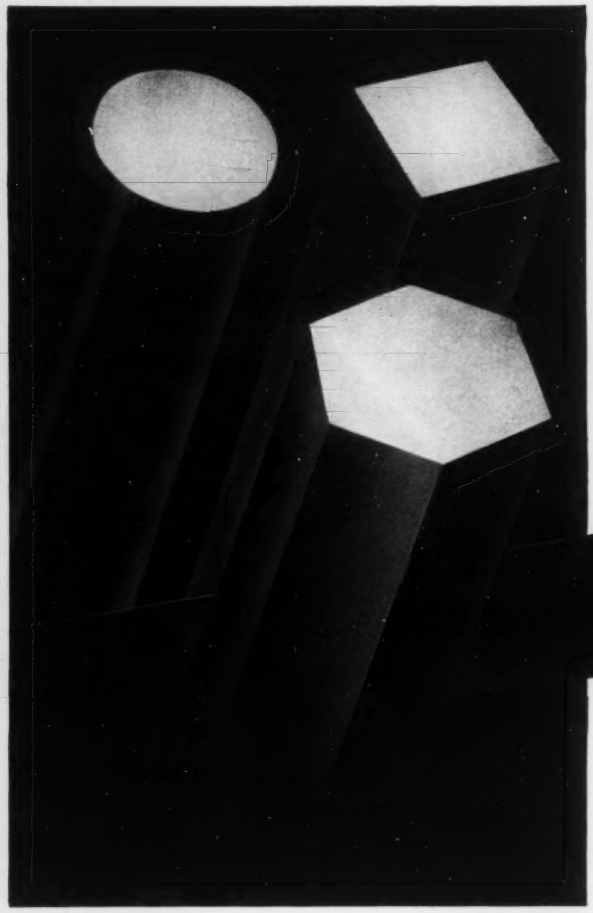
New Types of Burr-Blasters

New machines for non-machining operations on machined parts



Automated Pressure-Testing

USS MX — fastest free-machining screw stock — at no extra cost!



NOW "GRADE MARKED" FOR YOUR CONVENIENCE!

Rounds • Hexagons • Squares

- The grade of each lot is clearly marked on the seal!
- Takes the guesswork out of bar selection—lessens the chance of mistakes—saves time all along the line!
- Another reason why U. S. STEEL SUPPLY is the place to buy!

Quick delivery from our nearest warehouse puts you in position to cash in on many advantages of this remarkable screw stock!

If you are interested in turning out more parts per hour, switch to USS MX Free-Machining Screw Steel. This is possible because MX will take cutting speeds up to 50% higher than with regular Bessemer grades. This faster machinability has enabled hundreds of shops to boost production from 10 to 50%. And they have gotten up to 200% longer tool life. This means that MX will cut the cost of any part you now machine from ordinary screw stock.

You pay no more for these benefits. By increasing the rate of production, MX lowers the cost per part . . . by prolonging tool life, MX reduces down time . . . by assuring better finish, MX eliminates extra finishing operations . . . and by providing closer dimensional accuracy, MX helps to eliminate rejects.

U. S. Steel Supply can give you quick delivery on this remarkable screw stock in both Bessemer and Open Hearth Grades . . . in all the popular sizes and shapes. In addition, each lot in your order is neatly strapped and the seal identifies the lot as to grade. This is what we mean when we say "Grade Mark Service." It saves you time in identifying and stocking screw stock you buy from U. S. Steel Supply. All orders filled from warehouse nearest point of delivery.

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UNITED STATES STEEL

Equipment Lives Scrutinized

Government committee to study the controversial Bulletin F has been assigned. Industrialists and associations are asked to submit views and recommendations

TAX RELIEF in the form of a revised Bulletin F is still somewhere over the horizon. The bulletin defines useful lives of capital equipment, including machine tools, and often has come under the fire of industry spokesmen.

Two chief criticisms are: The directive is based on a fallacious idea that obsolescence is determined by age. Second, the latest revision dates to 1942. With the increasing pace of technical change, lives that may have seemed appropriate 15 years ago are wholly unrealistic now.

Importance—The application of Bulletin F can mean dollars in, or out of, the company budget. Take the case of a 15-year-old engine lathe. The bulletin says it has a life of 25 years.

To replace it today, the cost of the new machine (not counting the effect of salvage value) will consist of the machine price, plus two-fifths of the initial cost of the old machine that you have been unable to write off.

More important than that, many experts say, is the effect of inflation, which is bound to be greater over the long haul. If this lathe could be written off in ten years, inflation would be easier to take. (STEEL, Nov. 19, 1956, p. 99.)

Current—The Internal Revenue Service has named a committee to consider Bulletin F revisions. It will study types of equipment to include in a new listing and will review assigned useful lives.

Around Washington you hear predictions that the revision will be relatively minor. But government officials do admit that conditions have changed sufficiently to obsolete the bulletin. They say they're anxious to make it right, despite their admission that they will protect its ability to bring in revenue.

Industry's Role—Responsibility for a realistic revision rests partly on industry. The committee has asked industrialists and societies to comment on experience with useful lives as defined in the bulletin. "Operating conditions, technical improvement and economic changes will be considered important factors in determining normal useful lives," says one official.

Industry has until June 30 to get duplicate copies of recommendations into Washington. (The address is: Commissioner of Internal Revenue, Washington 25, D.C. Attention T:S:EA:F.) If you want a copy of the bulletin to study, send 30 cents to the Superintendent of Documents, Government Printing Office, Washington 25, D.C. Ask for IRS Publication No. 173.

Record Year

Fred H. Chapin, president, National Acme Co., Cleveland, reports his company's 1956 earnings were at an all-time high. They came to $8.60 a share. During the year, the company shipped machines at a rate of 80 a month.

This year is starting out the same way. He figures it will be a good year, but thinks sales may depend on some form of tax relief if they're to reach 1956 levels.

Officials are especially enthusiastic about industry reaction to the company's new 7/16-in. automatic bar machine. In about two months, more than 100 orders have gone on the books. The machine is the smallest the company has marketed. On one job, it drills, forms, threads and countersinks both ends of a small brass screw. It also slots the screw head. The machine has been run in the Cleveland plant, turning out a screw every second.

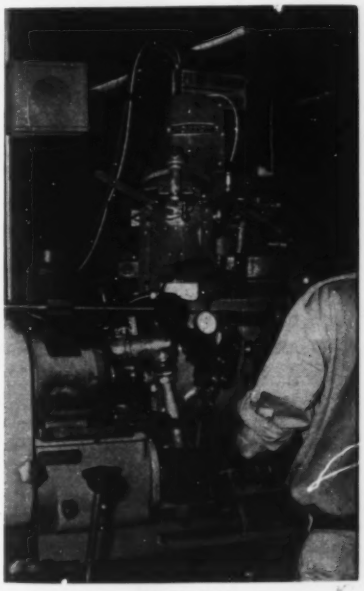
Dressing Aid

Grinder operators tell when wheels are trued properly by listening to amplified sound

OPERATORS at Johnson Motors, Waukegan, Ill., dress their grinding wheels by ear.

An electronic audio amplifier picks up the sound of the dressing tool during its pass across the wheel. By listening to the loudspeaker, an operator can tell more closely when the grinding wheel is properly dressed.

Mounting—The audio equipment is mounted on Norton grinders which plunge cut the thrust faces and bearing diameters of spiral gears used in Johnson Seahorses. Wheels are dressed with a 60 degree angle on the side and 30 degrees on the face. The tool is held in an automatic truing device.



AMPLIFIER
. . . speeds wheel dressing

The hi-fi equipment has two crystal pickups—one for each machine. They are connected to a 5 watt amplifier and a speaker located in a cabinet near the machines. Total cost: About $125.

According to Johnson, sound amplification has other industrial possibilities. Such equipment could be used to detect the seating of a part against a shoulder in an assembly operation. It can be used with any load which produces a sound.

6 good questions about aluminum FABRICATING

...and 6 good answers by Kaiser Aluminum Distributors

If you have a problem in fabricating aluminum, the chances are your *Kaiser Aluminum Distributor* can help you solve it. He has metal know-how and experience with many fabricating operations. Use his fund of technical knowledge, backed by the engineering ability of Kaiser Aluminum's field staff.

Here are the answers your Kaiser Aluminum Distributors have given on specific fabricating questions asked by aluminum users in various parts of the country. Questions such as these may also be bothering you.

Q. We machine high pressure fittings from 3½" diameter 2024-T4 rod. The fittings call for extremely fine tolerance on 1⅛–16 threads. The threads are O.K. as machined, but after anodizing they are oversize. We've scrapped too many completed pieces already . . . need an answer fast. What's the solution?

A. After finding that both new and old machined pieces were acceptable, a check was made of the anodized pieces. Here it became evident that the thread was enlarged because the pieces were *over-anodized*. By remaining in the anodizing bath too long, too great an increase in overall dimensions resulted. Closer control of anodizing time resulted in threads kept to close tolerances after they had been anodized.

Q. After welding 2" wide by ⅞" thick extrusions, the welds are cracking. We weld with an inert gas shielded arc. Why are the welds cracking?

A. A check showed that the extrusion was designed with a non-uniform cross section, varying from ⅛" to ⅞" across the 2" width. By preheating across the entire joint and then welding, a sound weld, free of cracks, was obtained.

Q. Can aluminum be joined by brazing? If so, what alloys are recommended for this process?

A. Yes, brazing is a highly satisfactory method of joining certain aluminum alloys . . . particularly 1100, 3003, 6053 and 6061 plus #11, 12, 21 and 22 brazing sheets. These alloys can be joined by any of the three common brazing processes: torch, furnace and dip brazing.

Q. We fabricate aluminum firing pins from 3/16" round 2017-T4 standard screw machine stock. The points of the pins must be held to exact tolerances. But the pins are so small that it is difficult to keep the points from breaking. Have you a solution?

A. In this case, the firing pin points must be formed as close to the collet as possible. Parts are usually machined on automatics with the point-end out. It is difficult to hold to tolerances a radius or point as small as a firing pin. Carboloy tools should be used, and they usually consist of one of the following: skive tools, form tools, or a pointing tool operated as an end working tool. Sometimes small diameter parts will break off when using a form tool on a cross slide, making a plunge cut. If a skive tool or pointing tool is used with the *proper* angles, very small diameters can be machined without parts breaking.

Q. Can aluminum be bonded with adhesives?

A. Yes. There are many synthetic adhesives presently available that are excellent for bonding aluminum to aluminum or to other materials.

Q. We are using 3/16" x ¾" extruded 2024-T3 aluminum bars to fabricate a part into the shape of a question mark. But we have had difficulties with springback and cracking. How can we correct this?

A. This manufacturer was using an alloy in a condition that gave maximum springback. After some study it was suggested that alloy 3003-H14 be used because of better formability, less springback with no cracking. Also the strength factor was entirely satisfactory. Accordingly 3/16" x ¾" 3003-H14 strip, cut from sheet and round-edged at the warehouse, was used. This material not only worked perfectly, but the customer cut his fabricating time almost 52 percent.

* * *

For the *right* answer, ask your Kaiser Aluminum Distributor.

Kaiser Aluminum Distributors have helped hundreds of fabricators find the answers to difficult problems. Whether it's selecting the right material for a particular job, suggesting more economical methods of operation, or solving complicated production problems, your Kaiser Aluminum Distributor is ready to give you instant assistance.

Naturally, you can always depend on him for prompt service in supplying you with aluminum cut to your specifications *as you need it*. Take advantage of the personalized service and technical know-how offered by your Kaiser Aluminum Distributor. Call him today!

Kaiser Aluminum

See "THE KAISER ALUMINUM HOUR," Alternate Tuesdays, NBC Network. Consult your local TV listing.

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Magnaflux operator wipes solution from crankshaft

Paper Wipes Parts Clean

DISPOSABLE paper wipers have replaced the cloth at Ohio Crankshaft Co., Cleveland. Employees use them to remove oil, grease and coolants from crank and camshafts during machining and inspection.

Finish inspectors like them for polishing and cleaning parts because they leave no lint on metal surfaces. They're used when handling and assembling complex electronic components which must be kept free of dirt and grease to function properly.

Testing—One of the toughest applications for the Scott Wipers at Ohio Crankshaft is on the Magnaflux testing machine. The oil-base solution containing magnetic particles must be wiped away when a defect is found so the area can be painted yellow.

It takes several paper wipers to clean away the solution and excess paint from the defective area.

Metal Shavings—Drilling grease pockets in crankshafts creates another tough wiping job. The parts become covered with lubricants which contain metal filings and shavings.

Distribution and disposal of the wipers are efficiently programmed. Employees get a box from the tool crib at the start of their shift.

Heavy duty crankshaft is cleaned after drilling operation

Glass Lining Tanks

Weld metal, forgings and plate in one vessel make it hard to fuse glass and make it stick

MAKING glass stick to the sides of pressure vessels takes a lot of know-how, states the Standard Steel Works Division, Baldwin-Lima-Hamilton Corp., Philadelphia.

Bonding the glass to steel plate, forged steel rings and weld metal is difficult.

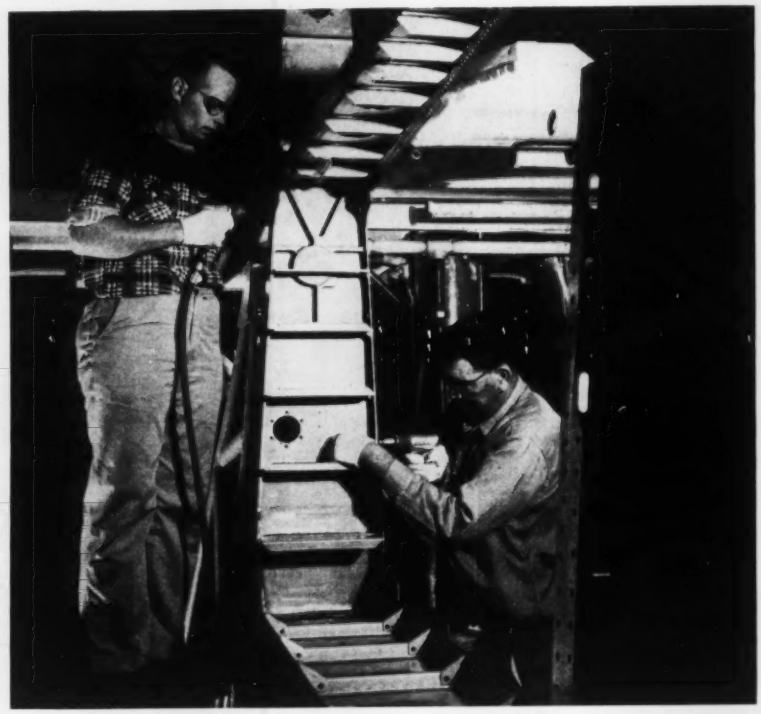
Here's how Standard Steel does it.

Powdered Glass—Pressure vessels are made by welding rolled and formed sections, and finishing the inside surfaces by hand. The inside is sprayed with a bonding material, and powdered glass is dusted on with porous fabric bags. The vessels are placed in a furnace and the glass is fused at 1600°F. Several successive coats of bonding and glass are applied before the required thickness is obtained.

Fusing problems have been most critical in the large flanged openings and in the welds. Forged rings are needed for such openings because they are thicker at the bend. The greater strength of the bead helps clamps hold the gasket tighter on the flange. Forgings also minimize warping and provide a larger flat area for seating the gaskets.

Rolling—Standard Steel makes the rings with a forge rolling process that minimizes the amount of machining needed. Sizes range from 15 to 84 in. ID. Glass sticks well to forgings.

SPRAY COAT
. . . makes glass powder stick



Forged wing spars save 100 lb, 273 parts and 3200 rivets. All four spars are interchangeable—a device that helped to hold die costs under $100,000

Heavy Forgings Are Lightweights

Slim jets are sleeker, faster with huge aluminum forgings made in giant hydraulic presses. Convair has room for many more, finds that the method pays its own way

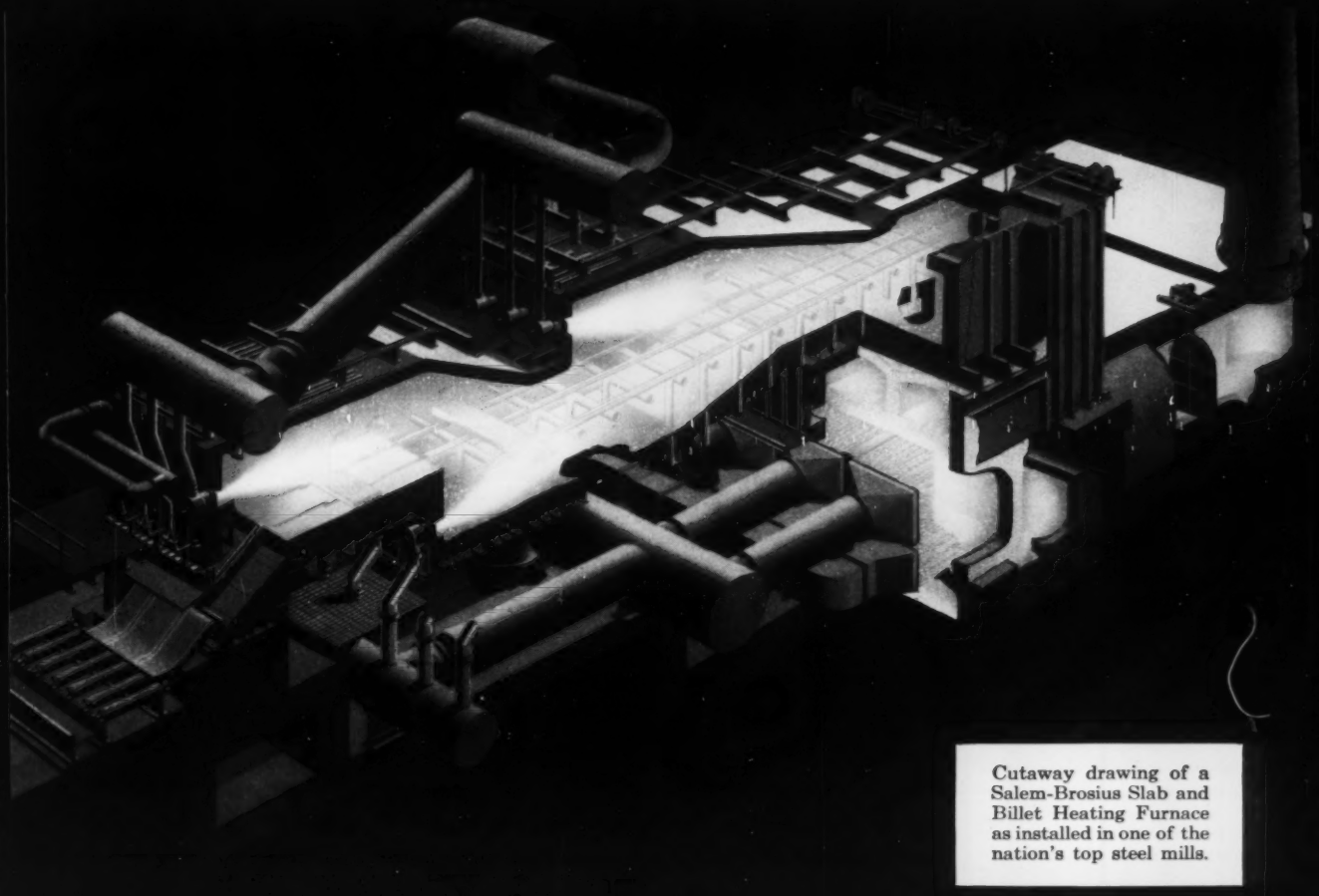
SUPERSONIC, all-weather, F-102-A interceptor jets are faster and lighter because heavy forgings are made of aluminum. They eliminate 273 parts, 3200 rivets and save 100 lb when used in the wing spars.

Convair division of General Dynamics Corp., San Diego, Calif., is the first to use heavy aluminum forgings on a regular schedule. Tooling costs are kept low by making one forging for all four wing spars (both fore and aft, and left and right wings). Eight are used in the fuselage bulkheads. Each bulkhead is made in symmetrically opposite halves. (The same forging forms both halves of the bulkhead.)

Biggest—The dies for the wing spars were the largest ever made. Each weighed 16,800 lb and cost about $100,000.

Wing spars were hand or blocker forged. The new dies eliminate 60 per cent of the machining needed after hand forging, 40 per cent of the machining required after blocker forging. Savings gained in the production of the first few airplanes more than paid for the dies. Convair plans to use 18 heavy forgings on the new, faster version, the F-102-B.

The forgings were made on the 35,000 and 50,000-ton presses at the Aluminum Co. of America, Cleveland, and the Wyman Gordon Co., North Grafton, Mass.



Cutaway drawing of a Salem-Brosius Slab and Billet Heating Furnace as installed in one of the nation's top steel mills.

In this Salem-Brosius furnace better steel products are born

All over the country, steel producers are turning to Salem-Brosius Pusher-Type Slab and Billet Heaters, because they have come to know that these furnaces will produce maximum tonnages of evenly heated, accurately temperatured steel at the lowest fuel consumption rate. The triple-fired furnace shown above features accurately controlled heating and soaking zones, heavy construction, recuperators for fuel economy, dual gas-oil fuel system, low maintenance cost, and many other advantages. These assure positive, automatic control of furnace output and heating quality.

And the efficiency, economy, ease-of-operation, and trouble-free service this furnace affords are typical of all the furnaces Salem-Brosius builds. Whether you require this or any other heating or heat treating furnace, Salem-Brosius offers equipment designed, engineered, and built not merely as a furnace but as a heating machine. You can purchase these furnaces as complete installations—equipped with all controls, piping and wiring—ready to operate. Write to us.

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SPECIAL MECHANICAL EQUIPMENT • INDUSTRIAL HEATING FURNACES • MATERIALS HANDLING EQUIPMENT

Located on a 100-acre site, 5 miles from the main plant, the 220,000 sq-ft building can be expanded in three directions to a total of more than 1 million sq ft

Two 60-ft bays hold seamless steel tubing and bar stock. Incoming inventory is unloaded from cars brought in on the enclosed railroad siding at right

An overhead system of interconnecting monorails facilitates transfer of tubing and bars from the receiving bays to the 180 machine locations in the plant

New Plant By-Passes Full Automation

AT A TIME when most talk about new bearing plants centers on automatic operation with automated handling and transfer, a plant in Newington, Conn., seems to be an exception.

It belongs to Fafnir Bearing Co., New Britain, Conn. Now in full production, it is designed to machine and heat treat 10,000 different types and sizes of ball bearings.

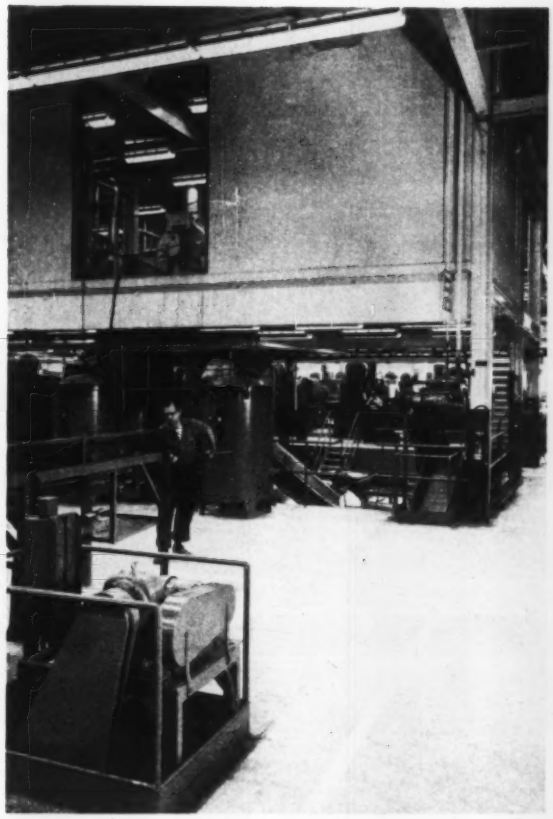
Solid Ground — Fafnir management is sure the reasons for the countermove are good ones.

First, officials point out, Fafnir's business is built on variety. While the company mass produces millions of bearings every month, its schedules during any period cover a tremendous variety of bearing types and sizes. The volume of any one product or line is far from stable.

Second, a degree of automation is built into the equipment—multiple spindle automatics and heat treating furnaces. Both process parts through several production stages without intermittent handling. This degree of automation, management decided, was about right for batch-type production.

By grouping similar machines in a department, Fafnir's production system gets efficient utilization of specialized setup men and toolroom personnel. Company executives say the result has been to reduce indirect labor and waste motion about as much as full automation would have.

Plant—The building covers 220,000 sq ft. Belt conveyors parallel to the seven rows of screw machines carry bearing rings from the machines to transfer points where automatic lifts raise boxes of rings to a gravity roller con-



Power unit (foreground) drives underfloor conveyor that dumps chips into pit at rear. Coolant is filtered off and re-used while chips are moved to an outdoor bin

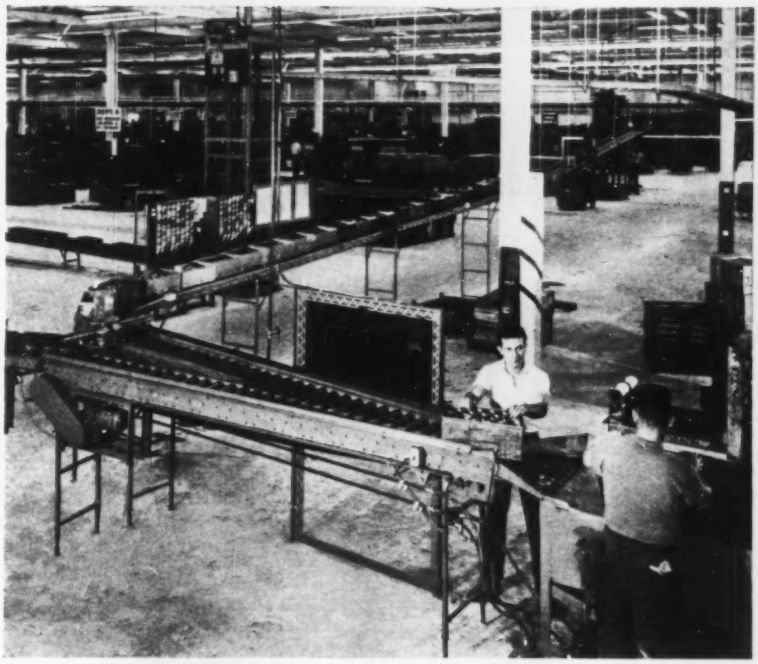
Belt conveyors run alongside each of the seven batteries of automatic screw machines in the primary machining area. Next stop for the rings is a washing station

Management picks centralized job operations to produce wide variety of types and sizes

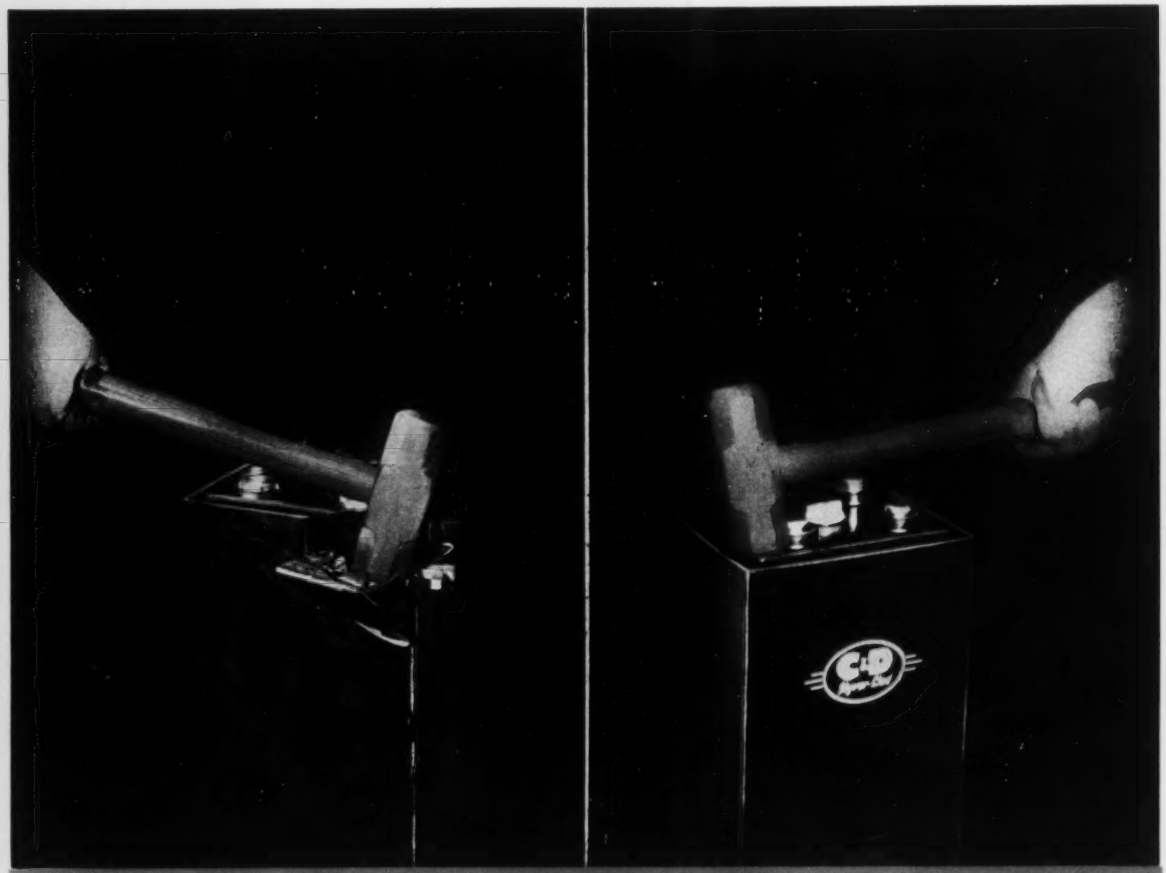
veyor system. All boxes move toward a central washing station en route to second machining, hardening furnaces and stock shelves or the shipping dock.

Chips are removed from the machines by underfloor conveyors running in 220-ft trenches beside each bank of automatic screw machines. Conveyors converge at a central chip processing pit.

Coolant is taken out of the chips. After filtering, the coolant is put back in the central system for reuse. Chips are blown to an outside storage bin.



From the seven machining department conveyors, parts roll down the gravity-feed conveyor line to the central washing station at right



See the difference! The battery cell on the left with a container and cover made of present standard material has been struck with a four-pound maul. Notice the smashing and cracking. C & D's Slyver-Clad cell, with the container and cover made of new, exclusive C & D *Hi-Impac* compound was struck the same way—without a sign of breakage! Imagine the damage to truck batteries prevented, and the resulting time and money saved on repairs with batteries made of C & D's new *Hi-Impac* material.

NOW...BATTERY BREAKAGE IN ELECTRIC INDUSTRIAL TRUCKS VIRTUALLY ELIMINATED

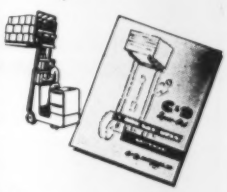
...with new C&D *Hi-Impac* cell cover and container!

New C & D *Hi-Impac* material for cell covers and containers for industrial storage batteries was developed jointly by C & D's research department and those of the major rubber companies. Thoroughly field tested, the *Hi-Impac* material virtually eliminates the danger of cell container and cover damage by dropping, collision between trucks, or from the impact of heavy objects falling on the battery. Thus, C & D *Slyver-Clad*® batteries with the *Hi-Impac* containers and covers practically never have to be shopped for cell replacement or repair due to cracked or broken containers and covers.

All sizes of C & D's famous, Five-Fold *Slyver-Clad* batteries are now made with exclusive *Hi-Impac* material. Now with C & D batteries you not only get extra-capacity in a standard size tray; you also get *Hi-Impac* cell covers and containers that virtually eliminate breakage. It's one more reason why—

C&D is your best battery buy!

For details and specifications on C & D *Slyver-Clad* batteries with *Hi-Impac* cell covers and containers for electric industrial trucks and motorized lift trucks, write for Bulletins IT-524/56 and IT-525/56.



C&D

BATTERIES, INC.

of Conshohocken, Pa.

SINCE 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Magnetic Chuck Handles Grinding, Milling, Shaping

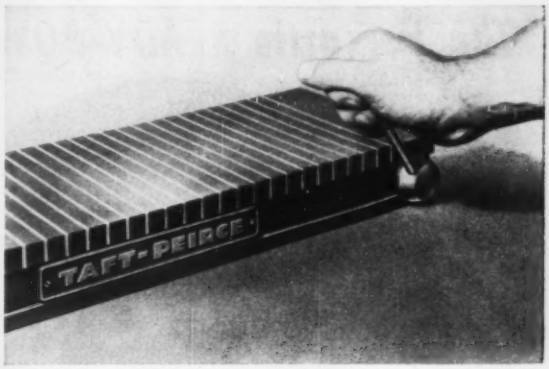
The Alnico V chuck design of Model 824 eliminates all dead spots and makes the surface usable from edge to edge. Magnetic power has been increased 28 per cent over comparable units.

The nonmagnetic separator material in the faceplate is a special epoxy resin. Separators provide faceplate stability and lighten the chuck. Wheel loading while dressing is eliminated.

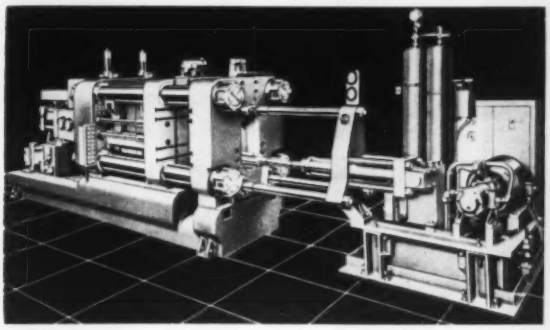
Problems with residual magnetism have been eliminated, and the chuck is used for fine tolerance work.

The chuck is 2 7/16-in. high. It has a magnetic surface of 168 sq in. and an 8 x 24 in. work surface.

The chuck can be ganged for handling large pieces. *Write*: Taft-Peirce Mfg. Co., Woonsocket, R. I. *Phone*: Poplar 2-1000



Diecasting Machines Can Take 200, 400, 600 and 800 Tons



This line of high pressure, cold chamber machines features improved locking which reduces die wear and maintains close casting dimensions.

The clamp link-wedge locking mechanism, plus the heavy platens and tierods, locks and preloads dies to the rated tonnage.

The motorized central screw adjustment is operated by pushbuttons for quick die setup and control.

Porosity, surface finish and fill difficulties are practically eliminated by high plunger speeds and positive pressure follow through from the pump. *Write*: Hydraulic Press Mfg. Co., a division of Koehring Co., Mt. Gilead, O.

Spindle of Radial Drill Press Moves To Work

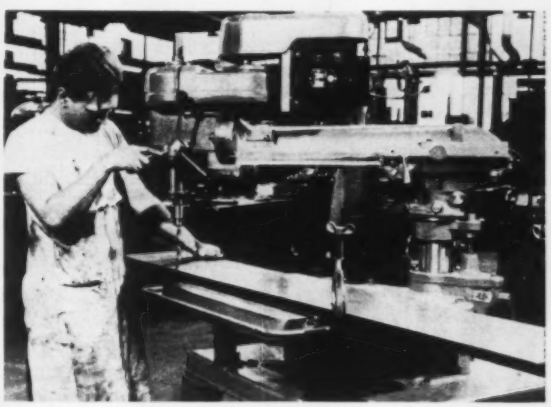
Widely separated holes can be drilled without moving the work with this drillpress.

The press head moves in and out through an 18-in. travel radius on a smooth traveling ram that permits drilling to the center of a 62-in. circle.

Head, ram and cradle swivel 360 degrees around the column to permit drilling anywhere on the table, or on work that must be kept on the floor.

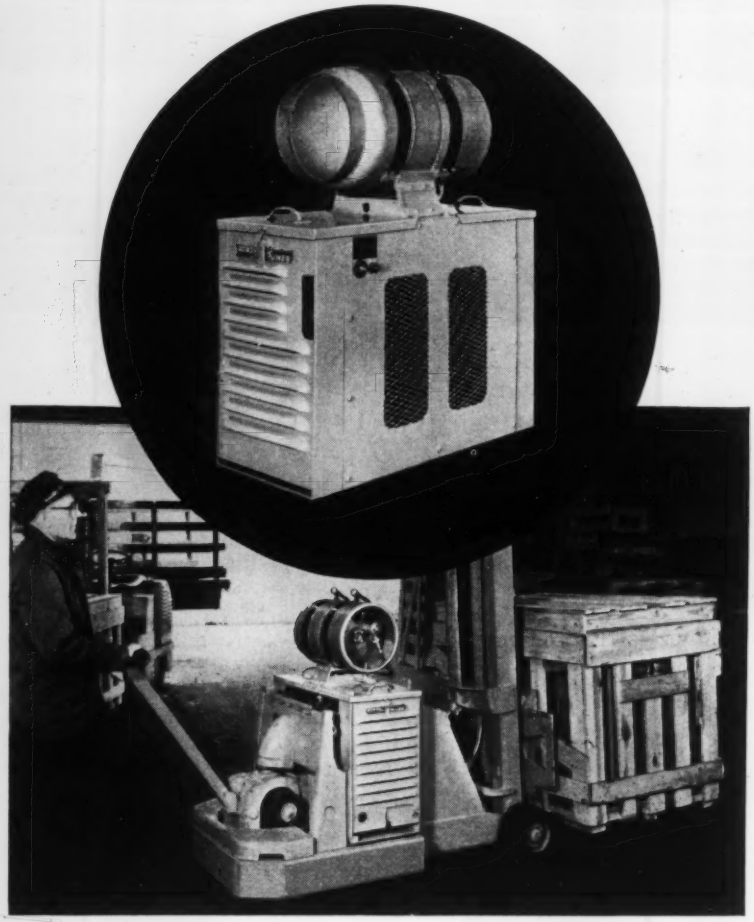
The head can be raised and lowered rapidly. It tilts 45 degrees and locks on both sides to prevent angle deviation under heavy loads.

The machine comes in 24 models with either 4¼ or 6-in. spindle travel and 30 or 42-in. column lengths. *Write*: Walker-Turner Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. *Phone*: Churchill 1-8400



LPG-ELECTRIC

The Versatile READY-POWER way!



New! Bantam Model W12 for Electric Powerized Hand Trucks

Ready-Power combines full electric power *with no fatigue* AND the economy and low maintenance of LP-gas in one compact new power unit. Installation is quick and easy on any make of motorized electric hand truck with adequate sized power compartment. Bantam model W12 accommodates an interchangeable 20-pound fuel cylinder, includes a quick-disconnect fuel line coupling for safety, has removable end, side and cover plates for easy accessibility. LP-gas components are listed by Underwriters' Laboratories and comply with Factory Mutual recommendations. It's easy to convert your present trucks to this modern, full-production power. Specify "Ready-Power" when ordering new trucks. Write for information.

READY-POWER

The READY-POWER Co., 3824 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electic Power Units for Industrial Trucks

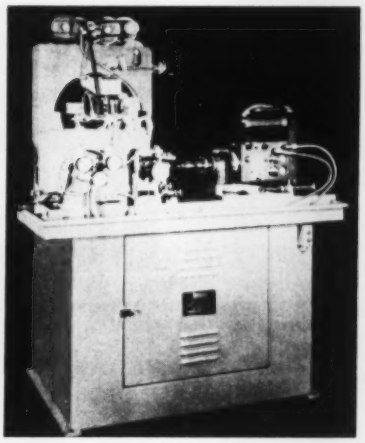
NEW PRODUCTS and equipment

Drill and Tapper

Model 408 is a high production machine for drilling or tapping long rivets, electrical terminals or similarly headed parts.

A long shank hopper feeder enables the unit to accommodate shank lengths of ⅜ to 3¾-in. and diameters of 0.090 to 0.375 in.

The drill has accurate positioning and secure clamping to assure the straight, concentric axial holes essential on thin wall tubular rivets.



Removable coolant tanks are provided for changing the coolant from drilling to tapping.

The machine operates on compressed air controlled by an electric solenoid valve. *Write*: Batchelder Engineering Co., 125 Main St., P. O. Box 159, Springfield, Vt. *Phone*: Turner 5-3101

Coolant Pump System

Highly abrasive liquids can be handled by this system. It has only one moving assembly; there are no gears or other close-fitting parts to wear or jam.

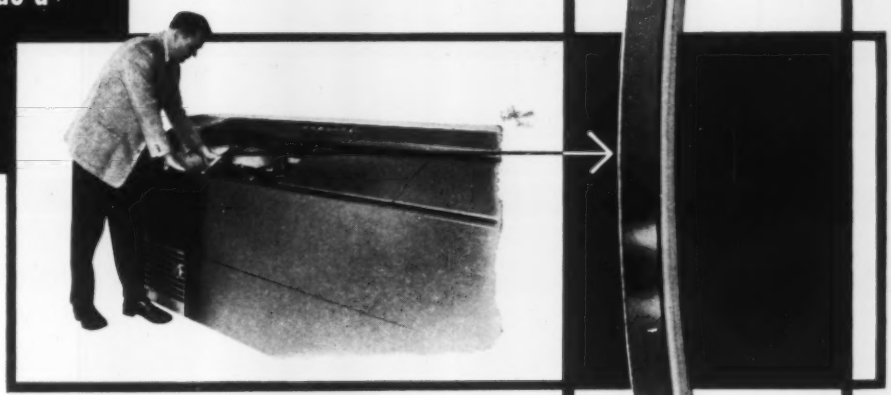
The flow-control valve adjusts

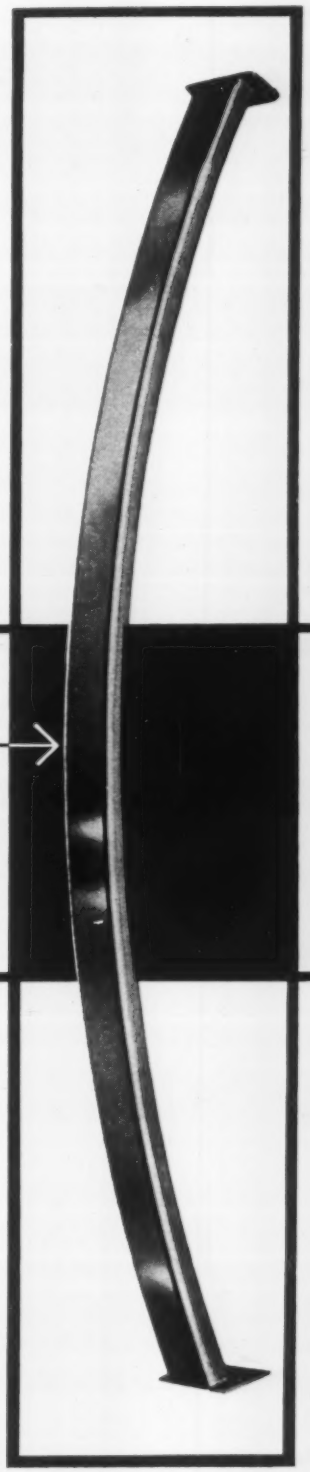
STAINLESS Opens the Door to LOWER COSTS

How One of the New 200 Series From The HOUSE OF STAINLESS Replaced Chromium-plated Carbon Steel to do a Better Job at Lower Over-all Cost

BEFORE—The sliding door rail of this well-known Dixie Bottle Cooler was formerly fabricated from carbon steel channel iron and then chromium-plated. In this process, the many steps necessary to fabricate and chromium-plate this part made it costly. Moreover, the corrosion problem encountered made the part fall short of the manufacturer's performance standards.

AFTER—Since the switch to one of the Type 200 stainless steels, recommended by the House of Stainless, Perlick engineers report these advantages: Fewer fabricating steps. Greater structural strength. Elimination of plating steps and cost. No plating to wear off. Lasting protection against corrosion. What is more, all these benefits were obtained at lower cost with stainless steel.





Photos, courtesy Perlick Brass Company, Milwaukee, Wisconsin

It's the end product cost and performance that really count—when it comes to the selection of material best-suited for your product.

Metallurgists at The House of Stainless are always ready to talk shop with you on the possibilities of stainless steel in your production.

This helpful service is backed up by deliveries from our complete warehouse stocks or direct shipments through our mill placement department.

Just phone LAfayette 3-7210

CHICAGO STEEL SERVICE COMPANY

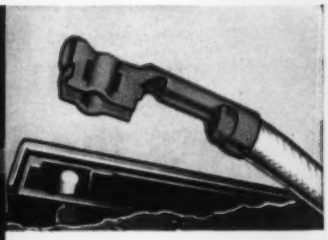
The House of Stainless
STEEL AT YOUR SERVICE

Kildare Avenue at 45th Street, Chicago 32, Illinois. Mailing Address: P. O. Box 6308, Chicago 80, Illinois.

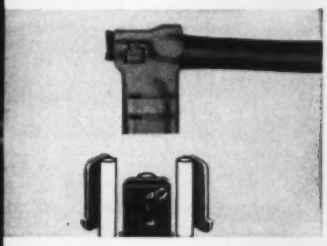
Milwaukee District Office: 757 N. Broadway, Milwaukee 2, Wisc. Telephone BRoadway 3-7874

Sales Representatives at Bloomington and Rockford, Illinois; Indianapolis and South Bend, Indiana; Cedar Rapids and Davenport, Iowa; Grand Rapids, Michigan; Minneapolis, Minnesota; Appleton, Wisconsin.

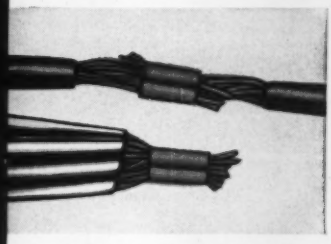
YOUR DEPENDABLE SOURCE FOR BOTH CARBON AND STAINLESS STEEL



Pin receptacle made of Duraflex—hard temper, in strip form, at left, as fed into the automatic wire terminator. Finished form above.



Flag "Faston," a receptacle for .250" x .032" flat tabs, made of Duraflex—hard temper.



Connector for splicing coil windings to stranded lead wires in hermetically sealed refrigeration motors, made of Duraflex.

For solderless electrical connections that are sealed in

AMP Incorporated turned to DURAFLEX

Electrical connections inside a sealed refrigeration unit are not easy to service. So, for long, trouble-free operation, it is essential to use superior materials.

AMP Inc., Harrisburg, Penna., is one of the leaders in the development and manufacture of solderless wiring devices. For their connectors to be used in refrigeration service they turned to Duraflex, Anaconda's superfine-grain Phosphor Bronze with superior endurance limit.

The superfine-grain structure of Duraflex offers greatly improved fatigue resistance and formability . . . and a finer, harder, smoother surface. It provides the extra resilience and strength for constant and enduring contact pressure essential in this type of connection. It also offers high resistance to corrosion by the moisture-absorbing additive in refrigerant, plus, of course, good electrical conductivity.

Duraflex is a premium product—yet it costs no more than ordinary phosphor bronze. Find out for yourself how Duraflex can help you cut costs, make a superior product. It is produced in sheet metal up to .062" thick and in wire up to 3/16" diameter. Write today for free samples you can test—specifying gage and temper. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.

3674

DURAFLEX

The New Superfine-Grain Phosphor Bronze with Greater Endurance Limit

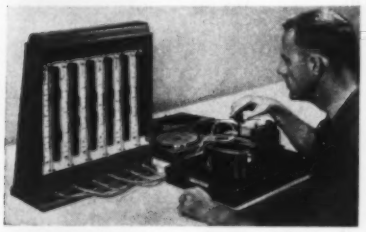
An ANACONDA® Product

instantly from 0 to 400 gallons an hour. The centrifugal pump is made of bronze. Discharge heads range up to 12 ft.

The 5-gallon welded steel tank has a removable inner basket which separates and retains chips for fast clean out. *Write*: S. Gelber & Sons Inc., 5806 N. Lincoln Ave., Chicago 45, Ill. *Phone*: Longbeach 1-3787

Air Gaging

This line of multiple-column instruments will check close-tolerance surfaces rapidly.



Up to eight separate dimensions can be measured simultaneously. A zero-centered scale permits tolerances to be read as plus or minus from the nominal dimensions. *Write*: Air Gage Division, Dearborn Gage Co., Dearborn, Mich. *Phone*: Logan 1-4440

Pyrometer Is Small

High strength magnetic material, printed circuits, and miniature tubes and relays are used in the HP-20 pyrometer. It takes only 50 per cent of the panel space required by conventional types.

It is used primarily for temperature control, but can also be used to measure other process variables

Switch housings are placed on conveyorized spindles, automatically spray finished, air dried and removed.

Each switch housing is uniformly painted by Model 21 pneumatically operated Binks spray guns.

A Binks automatic spraying machine at MICRO SWITCH...

"paid for itself in three months ...boosted finishing output 400%"

"We are now able to paint up to 945 switch housings an hour," reports Mr. Walter Gage, finishing foreman for the MICRO SWITCH division of Minneapolis Honeywell Regulator Company, Freeport, Ill. "This is four times our previous hand spraying rate and we use one-third the manpower."

Fast, uniform finishing

Switch housings are placed on conveyorized spindles which rotate as they pass through the spray booth. Binks pneumatically operated Model 21 automatic spray guns apply a uniform coating on all surfaces as each spindle passes.

Engineering help available

Working with your engineers and production people, Binks spray finishing engineers can help you cut costs...boost production...improve quality. Because Binks line of spray finishing equipment is so complete, they need not compromise in the selection of any part of a finishing system. The "right" equipment combination for your every production need, is always available.

For complete information

Contact your nearest Binks Branch Office or write direct to the address below.

Ask about our spray painting school
Open to all...NO TUITION...covers all phases.

8060

Binks
EVERYTHING FOR SPRAY PAINTING

SPRAY GUNS

AIR COMPRESSORS

SPRAY BOOTHS

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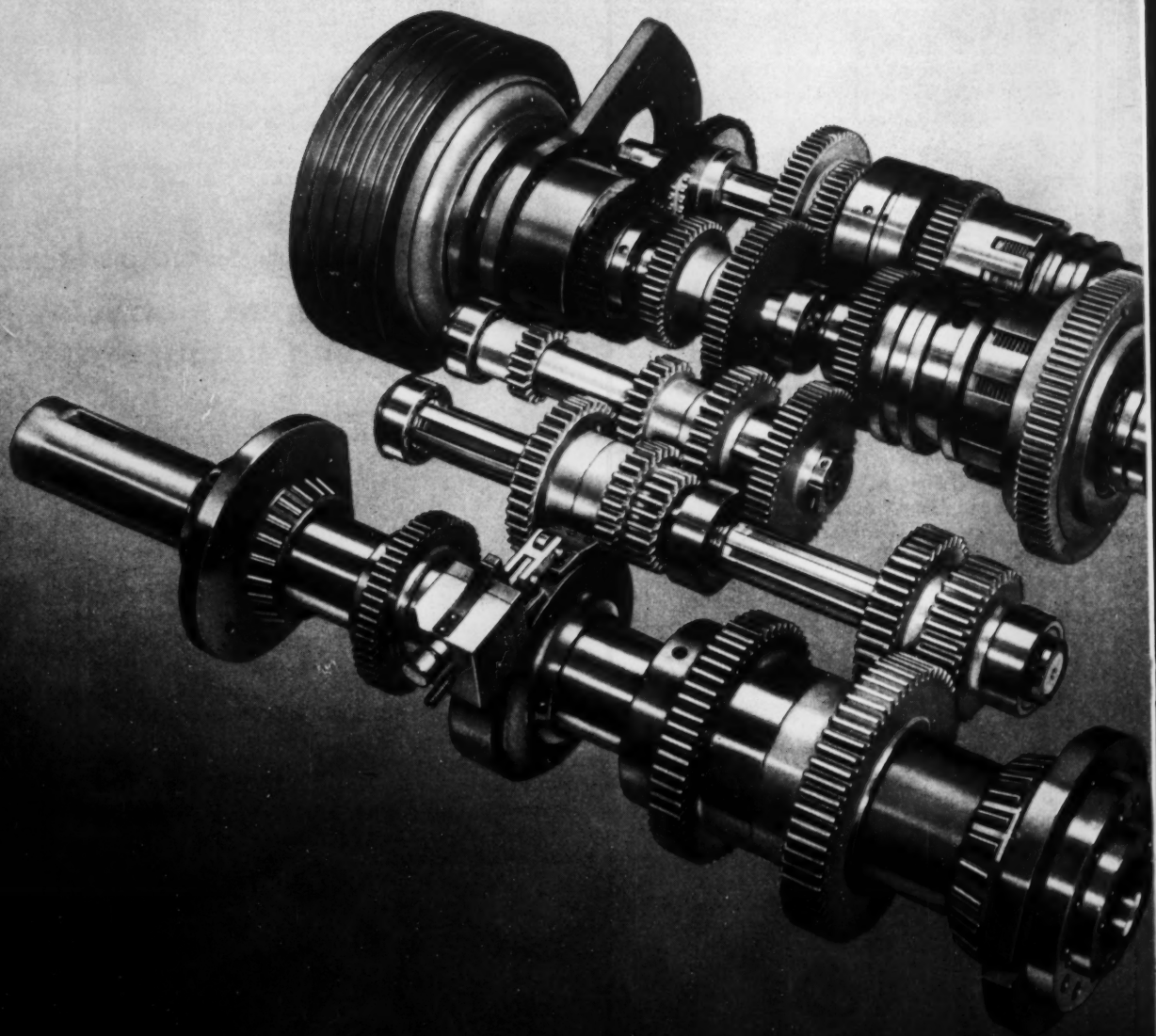
The **power reserve** *and* **range of speeds**

YOU'LL NEED FOR THE



TOOLS OF TOMORROW

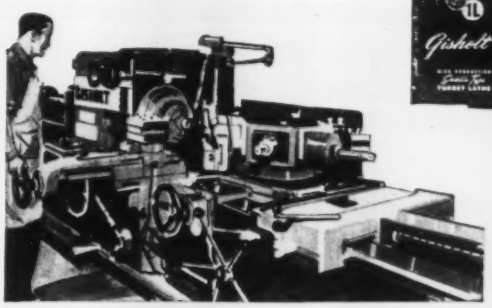
New GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

WANT MAXIMUM OUTPUT AND ACCURACY from today's carbide tools—with an ample reserve of power and speeds to meet tomorrow's tooling requirements?

That's what you'll get—*now*—from this powerful, rugged Gisholt MASTERLINE Saddle Type Turret Lathe. Prime example of this machine's advanced features is the rugged Headstock Gear Train, shown at the left. Here, you can get 24 different forward speeds—all from a *single*-speed motor. This means you get *full* power *all* the time—a critically important feature for those heavy cuts at punishing feeds.

But that's not all. To give you maximum performance from this powerful gear train, Gisholt designers have backed it with faster speed changes through the Hydraulic Speed Selector (effortless speed shifts without waiting or computing); a hydraulically operated Hi-Lo speed change in a 6:1 ratio (without stopping the spindle or shifting gears); and a new Self-Adjusting Electric Clutch and Brake (smooth, fast starting and stopping, plus more accurate inching of the spindle).

Ask your Gisholt Representative to give you the complete facts. Why not call him today?



ASK FOR complete set of Gisholt MASTERLINE Saddle Type Turret Lathe Bulletins.

GISHOLT MACHINE COMPANY

MASTERLINE GISHOLT SINCE 1887

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

more than

1,001 WAYS

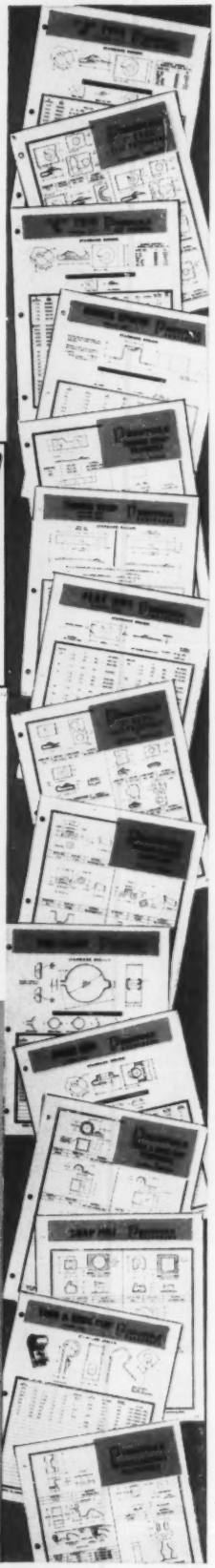
for Engineers to Solve Fastening Problems!

Your PRESTOLE representative has this volume of fastener information now—and will be glad to review it with you at your convenience.
See list below

PRESTOLE—designers and producers of precision-built, cost-saving, industrial fasteners of all types—has just completed a new volume of standard fastener data, designed to assist industrial design engineers in finding the *right* fastener for every application.

Complete, illustrated, specification-type data, based on years of fastening "know-how", is listed on every type of Prestole fastener available.

There is a method to solve any fastening problem . . . and Prestole has it! Let our representative call and show you how. No obligation, of course!



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1345 MIAMI STREET, TOLEDO 5, OHIO

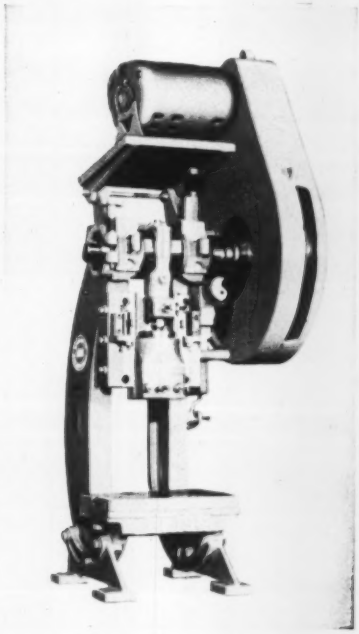
NEW PRODUCTS and equipment

such as speed, vacuum, density and electrical quantities.

Rate changes can be made on the pyrometer in the field. Electrical connections can be made from all sides. *Write*: Instrument Department, General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Bench Press Line

Many design features used in standard size presses are incorporated in this line of bench presses for the electrical, electronic and light metalworking industries.



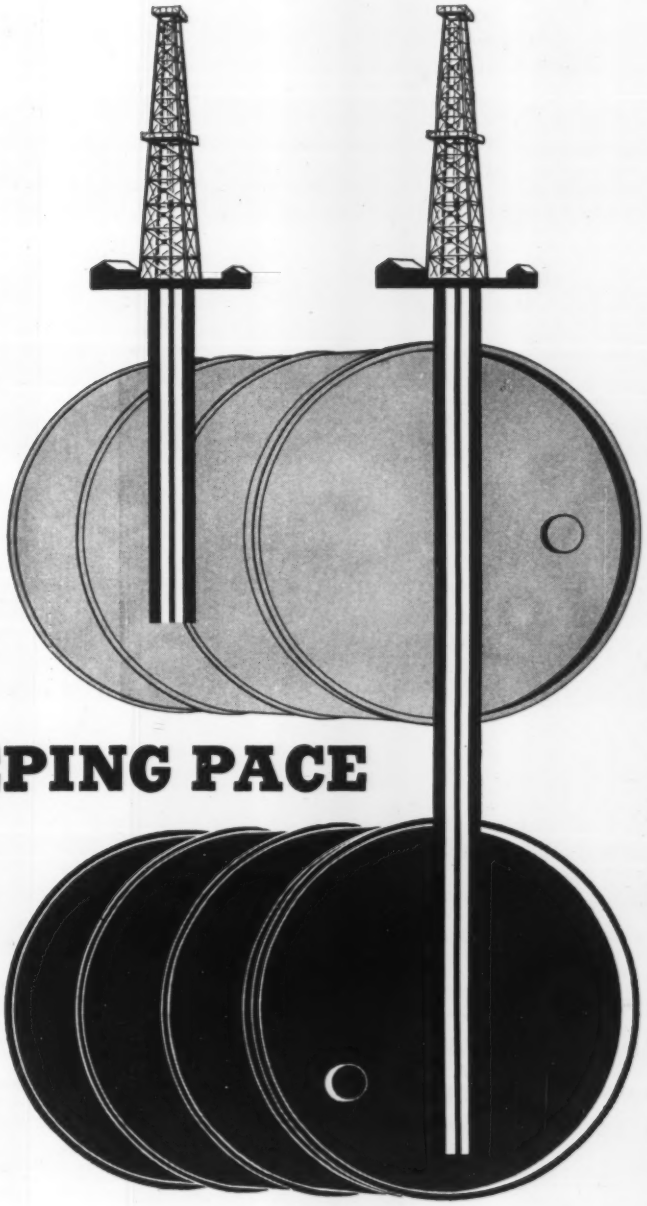
The line includes a 4-ton adjustable bed and horning press, 4 and 7 ton inclinable presses and a 10-ton fixed bed model.

Press features: Long slide, renewable ball seats and bronze ball cap bushings, split-bronze bearings and removable V-type gibbing. *Write*: E. W. Bliss Co., Canton, O. *Phone*: 7-3421

Recorder

Up to 16 points can be recorded on one chart by the Series 8000 electronic recorder.

Measurements for the null-balance instrument may be obtained by thermocouples, radiation detec-



KEEPING PACE

Drills were chewing their way down for about 2000 feet in the search for oil in 1916. Today's drilling depth is more than double that.

The change in drilling that forty years has brought well symbolizes many advances in the petroleum and chemical industries. Engineers have dug more deeply into the secrets of nature, too . . . have designed plants and processes to wrest new products and services from petroleum, ores and elements.

We mentioned 1916 because that is the year Sun Ship was founded. It has long served the swift-growing needs of petroleum and chemical industries. Year by year, the engineering skill and facilities of the great Sun Ship plant have proven their ability to meet the demands for plant and equipment keyed to the swift pace of progress in these and other important fields. Sun Ship keeps pace with progress.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.

Check your AIM*. . . Fuller Manufacturing Company did . . .

Strapping transmissions saves money, speeds handling

Acme Idea Man, Chuck Deerwester, cooperated with Fuller Manufacturing Co. in adapting this steel strapping idea.

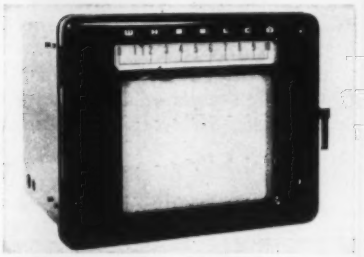
ACME STEEL STRAPPING helped Fuller Manufacturing Company, Kalamazoo, Michigan, eliminate costly crating and slow manual handling. Now, two transmissions are steel strapped to a wooden skid, with protective top frame. This is accomplished in half the time previously required for the crating operation by the same crew. (Idea No. U6-6)

The steel strapped skid loads are moved by lift truck, can be stacked six high. Appreciable savings in material cost and storage space are realized. And, damage in transit is reduced.

***Check your Acme Idea Man.** His Ideas-In-Action files prove scores of ways to better protect products from production lines to customers. Write Dept. SDU-37 Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Avenue, Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

NEW PRODUCTS and equipment

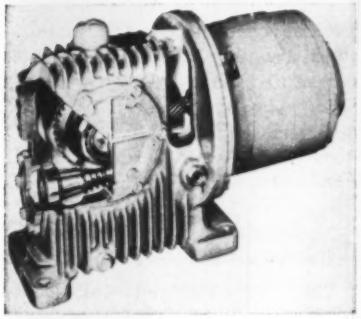


tors and other sensing units where the measured variable can be resolved into an electrical signal.

Up to six limit switches may be incorporated to provide high and/or low signal indication. *Write*: Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill. *Phone*: 4-7871

Gearmotors

A double-enveloping worm gear secondary and a helical primary are used in these right-angle gearmotors because of their high load-carrying capacity on small center distances.



The motors have 28 standard output speeds—6.25 to 525 rpm.

All teeth within an arc of 45 degrees on the gear are in simultaneous contact with threads on the worm. This makes the gearing operate smoothly. *Write*: Cone-Drive Gears Division, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

Press Uses Electric Clutch

The time lag between tripping and the start of a stroke is eliminated by this clutch; its engagement is instantaneous.

Any number of presses can be tripped to synchronize in any de-

The Leaders of American Industry

SPECIFY

METALWASH

MACHINERY

For Cleaning, Pickling, Drying, Heat Treating, and other Metal Parts Processing

RIGHT NOW your cleaning and finishing departments are ready to benefit from the same gains in efficiency and capacity that many leaders of American Industry already have achieved . . . by specifying Metalwash.

When you specify Metalwash you share in the skill and experience we have developed in more than thirty years of specializing in the design and manufacture of machinery and methods for metal parts processing.

Write today describing the nature of your cleaning and finishing requirements . . . a Metalwash representative will call to show you our approach to your problems.

Send for your copy of our 20-pp catalog. It illustrates and describes 50 different applications of Metalwash metal parts processing machinery.

OUR 30th YEAR

INDUSTRIAL DIVISION

Metalwash

METALWASH MACHINERY CORPORATION

917 NORTH AVENUE, ELIZABETH 4, N. J.

Representatives in principal cities in the U. S. and Canada

WHEELOCK, LOVEJOY & COMPANY, INC.

1250 Marquette Street, Cleveland Ohio

WHEELOCK, LOVEJOY & COMPANY, INC.

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7 WAREHOUSES AT YOUR SERVICE

You'll get quick action on your order for alloy steel bars, billets or forgings . . . no matter what size, shape or heat treatment you require . . . when you call any one of our seven warehouses.

All seven are conveniently located in principal industrial areas. Each is staffed by expert metallurgists, and is well-stocked to give you speedy service.

Fill your current needs by ordering our own HY-TEN steels, the "standard steels of tomorrow", or standard AISI or SAE grades.

Or write today to our Cambridge office for your *free* Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

In Canada: Sanderson - Newbould, Ltd., Montreal and Toronto

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144 Milton Street, Buffalo New York

WHEELOCK, LOVEJOY & COMPANY, INC.

4524 W. Mitchell Avenue, Cincinnati Ohio

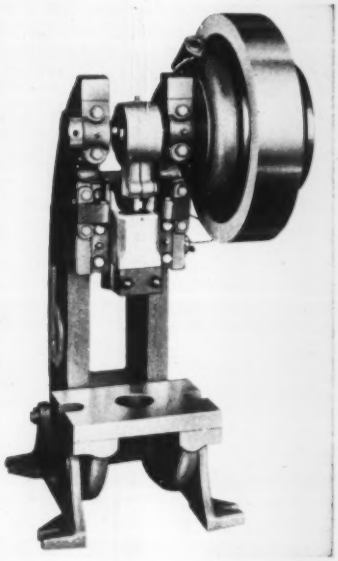
HOME OFFICE:

WHEELOCK, LOVEJOY & COMPANY, INC.

131 Sidney Street, Cambridge 39 Massachusetts

NEW PRODUCTS and equipment

sired pattern although they operate independently of one another. Each press does part of the operation. Timing impulses are supplied to each press by cam or tape, electronically or by other means.

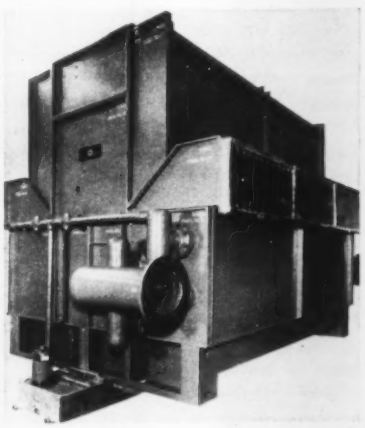


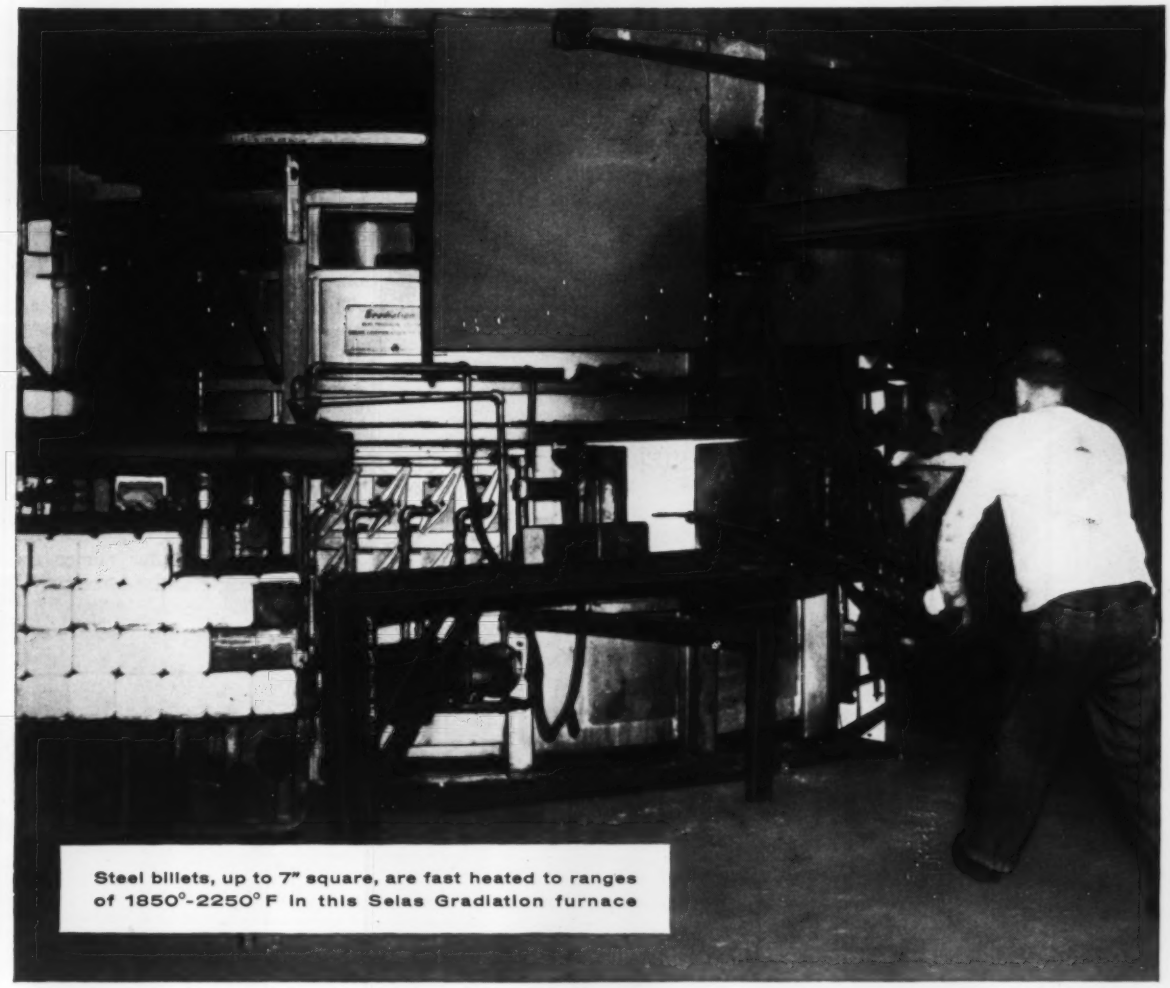
Tooling can be split between presses; construction and maintenance are simplified; spares can be substituted easily at any stage; and costs are reduced. *Write*: Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif. *Phone*: Plymouth 6-8134

Aftercooler

This self-contained unit cools compressed air and removes moisture from it.

Air enters above the coils, trav-





Steel billets, up to 7" square, are fast heated to ranges of 1850°-2250° F in this Selas Gradiation furnace

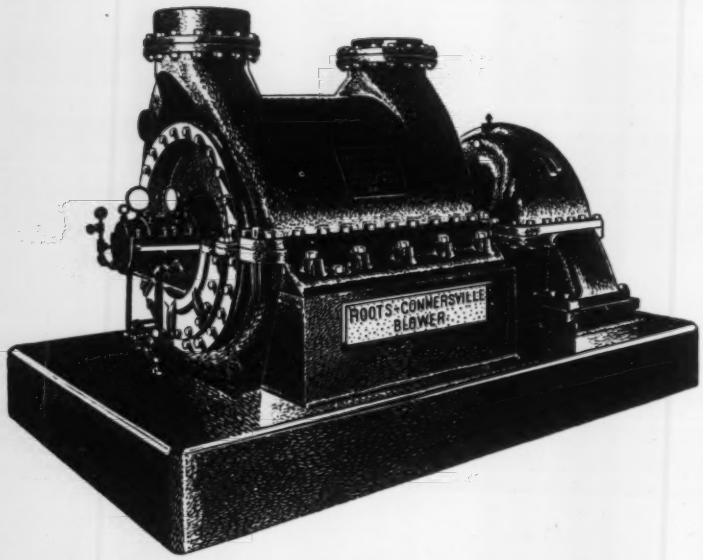
FAST HEATING WITH *GAS*

- improves forgeability
- reduces power requirements
- increases metal flow

A Gas-fired Gradiation® furnace designed and built by Selas Corporation for Lansdowne Steel and Iron Company, Morton, Pennsylvania heats billets to 1850°-2250° F at rates of 2 to 5 minutes per inch of thickness—thus virtually eliminating scale. Some fast heated billets are forged at temperatures 300° F below conventional methods.

Improved forgeability, directly attributable to fast heating with Gas, reduces power requirements at the usual forging temperatures. Or, for given power applied, permits an increase in the amount of flow or deformation.

For information on how Gas equipment can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and outstanding results you get with Gas and modern Gas equipment. *American Gas Association.*



R-C centrifugal blowers assure accurate control of volume and pressure

At any speed, Roots-Connersville centrifugal blowers assure uniform delivery of air or gas without the use of receivers. In matching supply to changing demand, this inherent operating advantage simplifies accurate and instantaneous control of volume and pressure.

R-C centrifugals may be direct-connected to high speed eiectric motors or turbines. Operating speeds may be further raised with speed increasing gears. Occupying a minimum of space and perfectly balanced, with semi-rigid bearing supports to dampen vibration, they do not require special, costly foundations.

Liberal design of diffuser and return passages results in low velocities, normal efficiency even when build-up occurs and exceptionally quiet operation. Operating without internal lubrication, oil-free air is discharged, making it ideally suited for exacting process applications. For complete specification details, write for Bulletin 120-B-14.

Engineers—unusual career opportunities await you at Roots-Connersville. Address your resume to Professional Employment Manager.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

357 Hillside Ave., Connersville, Indiana. In Canada—623 Adelaide St., W., Toronto, Ont.

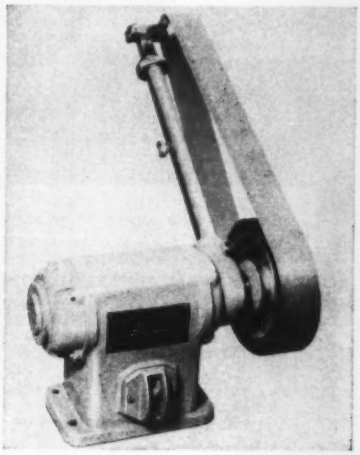
els through them and into the central plenum where the moisture falls.

Dry air is assured for the operation of automatic machines, paint spraying, sandblasting and special processes such as air liquefactions.

This model comes in four sizes. Capacities go to 23,000 cu ft per minute of free air cooled from 275 to 85°F at 75 degree wet bulb atmospheric air. *Write*: Niagara Blower Co., 405 Lexington Ave., New York 17, N. Y. *Phone*: Murray Hill 6-5363

Bench Grinder Arm Rotates

The DBA-O grinder comes in models for single and 3-phase current. A 0.6-hp motor drives the 6-in. wheel at 5100 sfpm.



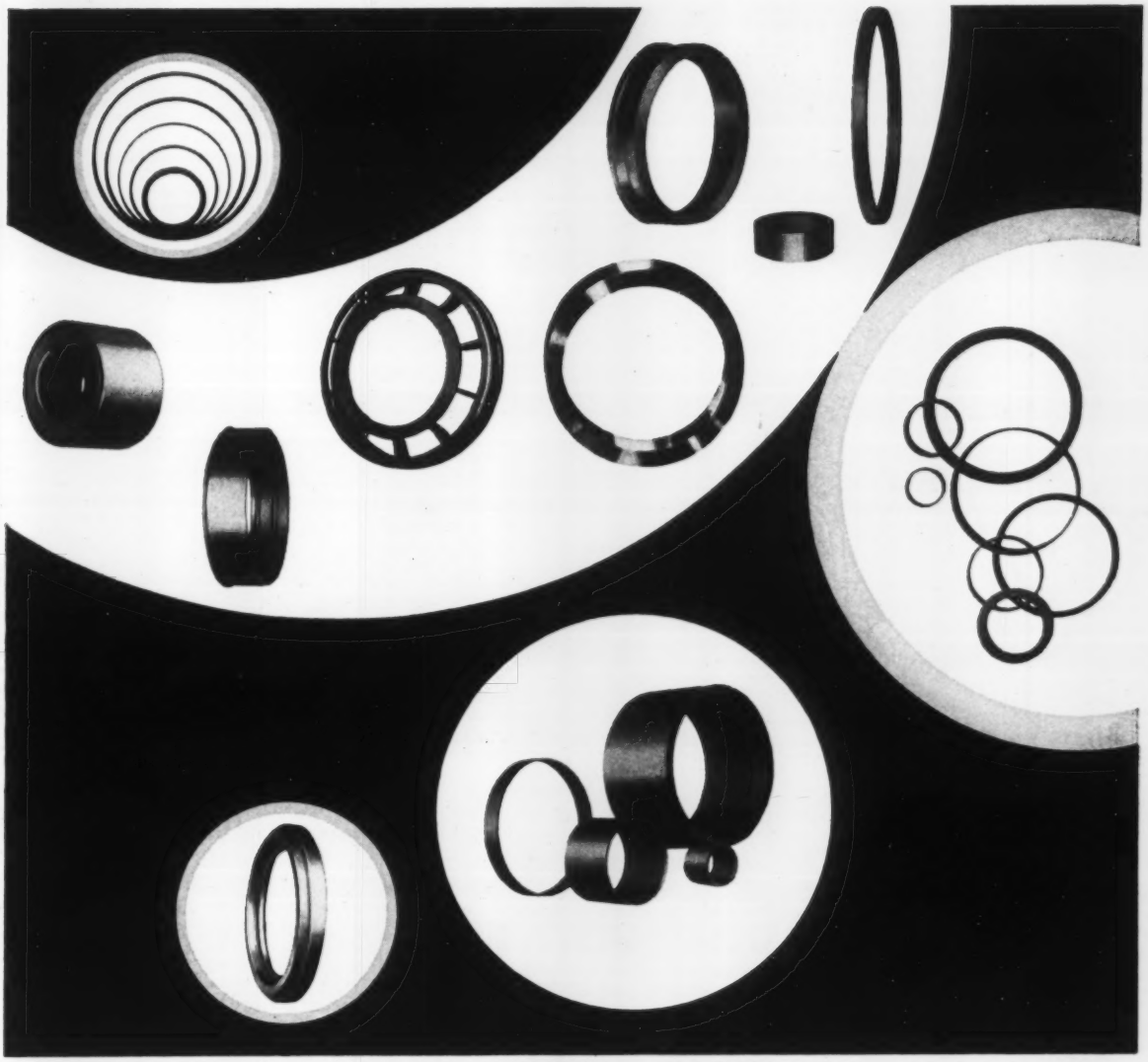
The idler arm incorporates belt tracking and tensioning mechanisms and can be rotated 360 degrees around the spindle to provide for operations in any position.

Standard abrasive belt size is 2 in. wide and 48 in. long. *Write*: Curtis Machine Division, Carborundum Co., Jamestown, N.Y.

Crossdrilling Machine

Multiple operations are done rapidly on this automatic machine by four horizontally mounted drill heads. They are located on a common plane and pivot around the axis of the workpiece through an arc of 270 degrees.

A four-position rotary drum switch controls the sequence of



IF THE PROBLEM IS CIRCULAR . . . BRING IT TO CLEVE-WELD

If you now use circular parts that are cast or forged, or if you are planning a new circular component, consider the Cleve-Weld Process for three reasons:

1. We can cut your waste costs up to 30% over bulky cast or forged parts.
2. We can eliminate excessive machining by designing sections suitable to your needs.
3. We can, consequently, help you speed your over-all production and cut costs further.

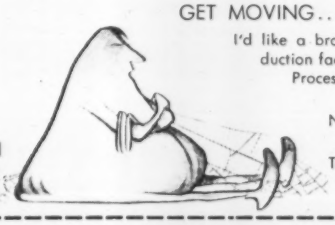
Where expensive alloys and "wonder metals" are involved, we may be able to save you enough in waste and machine time to pay for the finished part.

Our proposition is simple. We have 45 years of design, metallurgical and production experience that can probably save you money. To find out, call, or write and send drawings to: Circular Welded Products Department, Cleveland Welding Company, West 117th Street and Berea Road, Cleveland 11, Ohio.

Another AMF Product

CLEVE-WELD PROCESS
RIMS · RINGS · WELDMENTS

CLEVELAND WELDING DIVISION
AMERICAN MACHINE & FOUNDRY COMPANY
Cleveland 11, Ohio



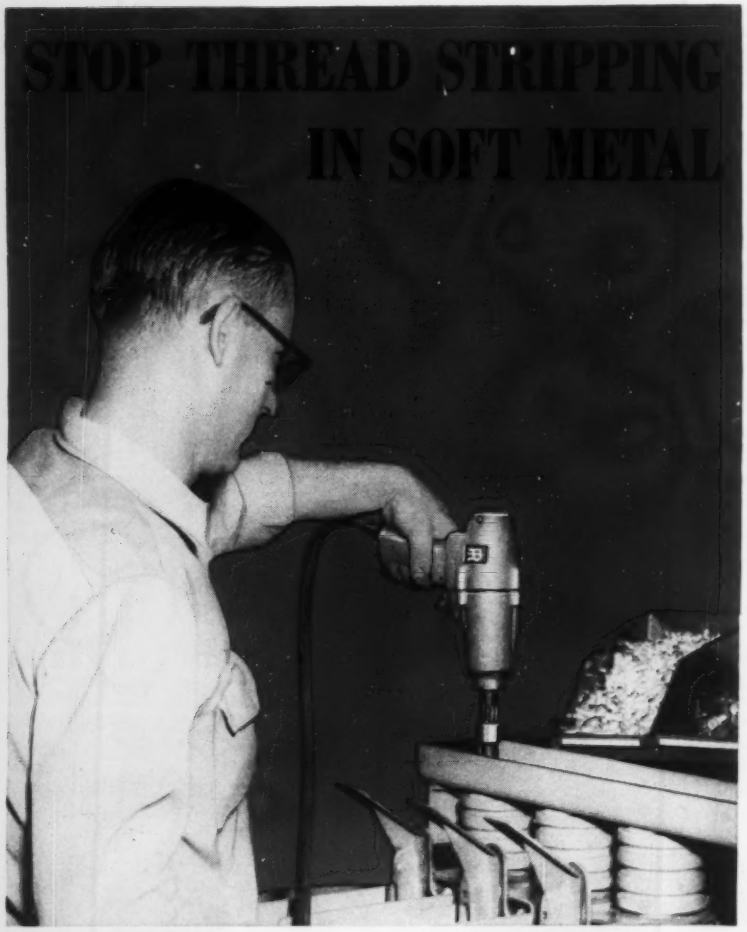
GET MOVING . . . MAIL THIS COUPON NOW! ST-704

I'd like a brochure on Cleve-Weld's metallurgical, design and production facilities. Particularly, I'd like to know how the Cleve-Weld Process can cut component costs while improving performance.

NAME_____

TITLE_____

ATTACH TO YOUR COMPANY LETTERHEAD AND MAIL TODAY!



here's how it's being done with Ingersoll-Rand TORQUE CONTROL impactools!

If you assemble soft metal threaded parts, such as aluminum or bronze, take a look at the improvement record made by this large electrical manufacturing company.

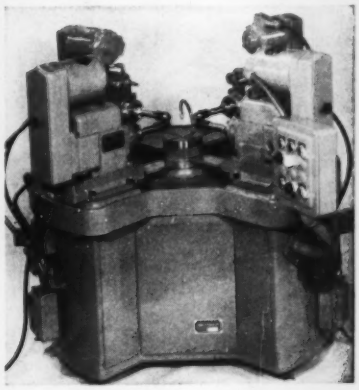
Parts spoilage is substantially reduced and product quality greatly improved since changing from conventional air powered wrenches to new Ingersoll-Rand Torque Control Impactools for running nuts and cap screws. These revolutionary Impactools shut off instantly and automatically when the preset torque is reached. No more stripped threads . . . and every fastener is precisely tightened for top quality.

Call or write for bulletin 5170, or ask for an obligation-free demonstration.

Ingersoll-Rand
11 Broadway, New York 4, N.Y.

8-523

NEW PRODUCTS and equipment



operation of the heads. Complete operating cycles can be set up or changed quickly. Control of the four heads is interlocked to prevent drill interference.

The heads can be operated simultaneously when holes do not intersect. *Write*: Russell T. Gilman Inc., Grafton, Wis.

Adjustable Speed Drives

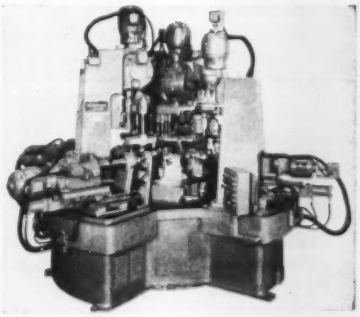
These electronic, direct current drives use the driving motor's counter electromotive force for speed control. Five sizes, ¾ to 3 hp, are available. They provide any speed from 35 to 1750 rpm.

The drive motor is used as the tachometer. Motor speeds will not vary more than 0.5 per cent of full speed at any setting. *Write*: Weltronic Co., 19500 W. Eight Mile Rd., Detroit 19, Mich. *Phone*: Kenwood 2-2800

Machine Is Versatile

This six-station machine is used to bore, face, hollow mill, drill and tap three different cast iron gear housings.

Five cam feed drilling units and



two lead screw tapping units are used to process the parts.

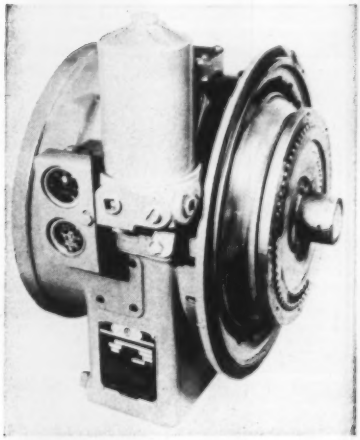
A slide adjustment enables the horizontal units to handle left-handed parts.

At 100 per cent efficiency, 256 parts can be machined in an hour. *Write*: Hartford Special Machinery Co., 294 Homestead Ave., Hartford, Conn. *Phone*: Jackson 5-1401

Torque Converter

High speed diesel and gasoline engines used with shovels, front-end loaders, hoisting machinery, road rollers and graders can use the 1300 Series of single stage converters.

The units are for engines producing from 30 hp at 1450 rpm to 212 hp at 3200 rpm.



Specific torque ratings—165, 200, 240, 285 or 330 lb ft—depend upon the impeller blading selected.

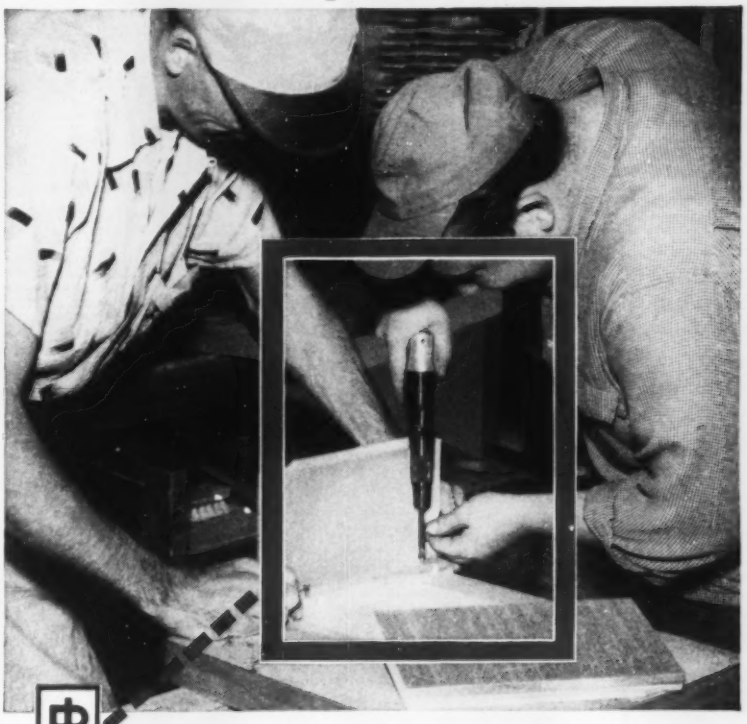
Blade design causes the turbine to develop a counterhead which stops fluid circulation at high speeds. Impellers with different bladings (number of blades and pitch) are interchangeable. *Write*: Hydraulic Division, Twin Disc Clutch Co., Rockford, Ill. *Phone*: 4-5664

Winch Hoist Is Light

The Cadillac hoist comes in three models with capacities of ½, 1½ and 2 tons. The smallest weighs about 7½-lb, the largest about 13½-lb.

Each hoist is equipped with pre-

is there a COST-SAVING idea in this picture for you?



IR air-powered screw drivers end handwork in close quarters

*Exceptionally small side-to-center distance of this Ingersoll-Rand air-powered screw driver permits running screws that electric tools can't reach and that formerly had to be driven by hand.

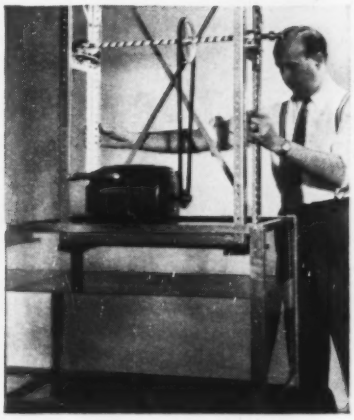
AIR engineering at work
REPORT No. 4211.05

The men pictured above are saving $1.35 on a single unit. That's a saving of $87.75 a day for their company. Production has increased 160% since the two men changed from a combination of electric tools and hand methods to I-R Air-Powered Screw Drivers. At this rate, the I-R tools *paid for themselves in 3½ days!*

Can you picture a similar saving in your plant? An I-R AIRengineer, with over 1000 sizes and types of air and electric tools to work with, will gladly analyze your assembly operation and make recommendations without obligation. Write today!

Ingersoll-Rand
11 Broadway, New York 4, N.Y.

Motor and Control—
standard ratings now
available for immediate delivery
from warehouses coast-to-coast!



TOMORROW:

A Standard Motor That Can Live With Water?

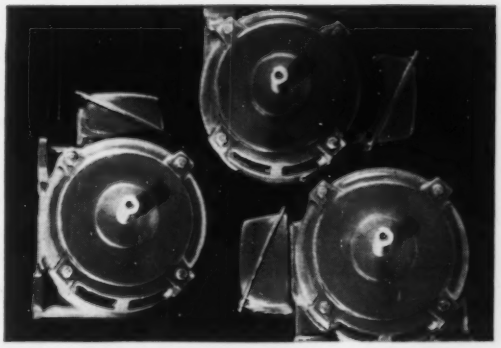
The New Life-Line A Is Another Step Closer

Today's standard motors cannot long endure the water conditions shown here. But Westinghouse is working toward a standard motor that can "live" with water like this tomorrow.

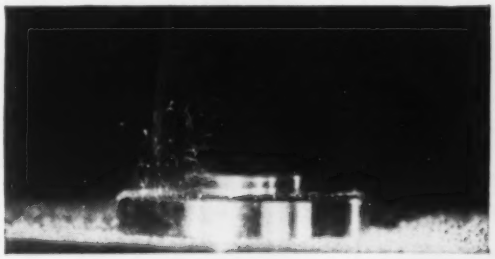
Meanwhile improved frame design, insulation and bearing protection give the Life-Line® "A" more protection than ever before. It can withstand more water and other contamination than any other motor you can buy. It's industry's closest approach to a standard motor that can operate with or within water—in any amount.

Your Westinghouse sales engineer can show you many additional reasons why the Life-Line "A" is industry's most advanced and preferred motor. Call him today.

J-21924-A



New cast-iron frames and brackets utilize the finest grained castings with uniformly thick-walled sections precisely fitted and sealed—another reason why the Life-Line "A" is so preferred.

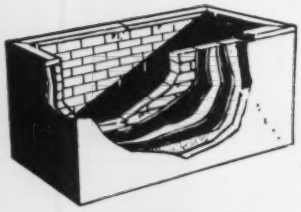


Two outer seals of new 4-way sealed bearing act as flingers and literally throw off damaging contaminations. Inner seals, attached to outer bearing race, are stationary and form a positive labyrinth.

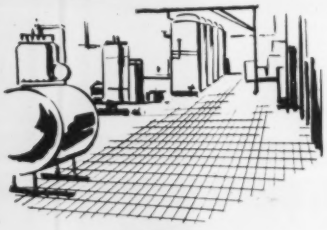
YOU CAN BE SURE... IF IT'S

Westinghouse

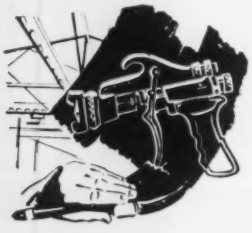
the most enduring way to ... STOP CORROSION



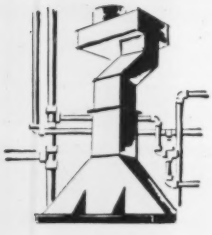
with ATLAS TANK LININGS for steel or concrete tanks. A complete corrosion-proof covering system from primer to protective brick sheathing.



with ATLAS CORROSION PROOF CEMENTS for the most severe conditions. Protection against acids, alkalies, salts, solvents and other corrosives.



with ATLAS PROTECTIVE COATINGS for almost every purpose. A complete line to assure the proper protective coating for the job.



with ATLAS RIGID PLASTIC STRUCTURES for tanks, fume exhaust duct work and complete pipe systems. Fabricated of highest quality corrosion proof plastics.

Specify ATLAS

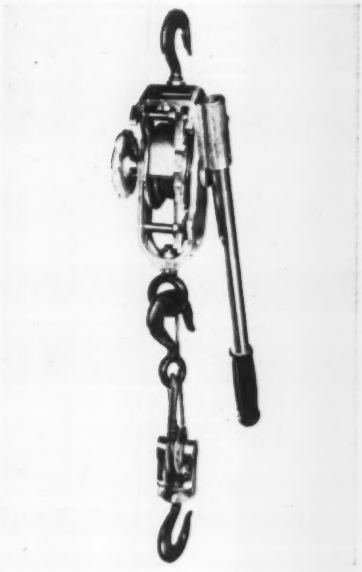
Tear out this ad and check the block where corrosion protection is most needed in your plant. You will receive a complete bulletin giving all technical information.

- ☐ CEMENTS
- ☐ LININGS
- ☐ PROTECTIVE COATINGS
- ☐ RIGID PLASTIC STRUCTURES

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

TECHNICAL REPRESENTATIVES THROUGHOUT THE UNITED STATES

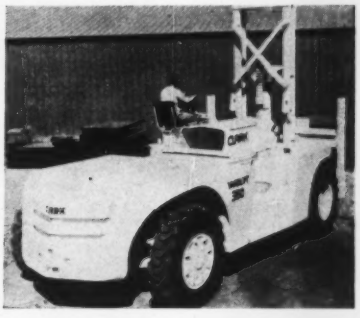
NEW PRODUCTS and equipment



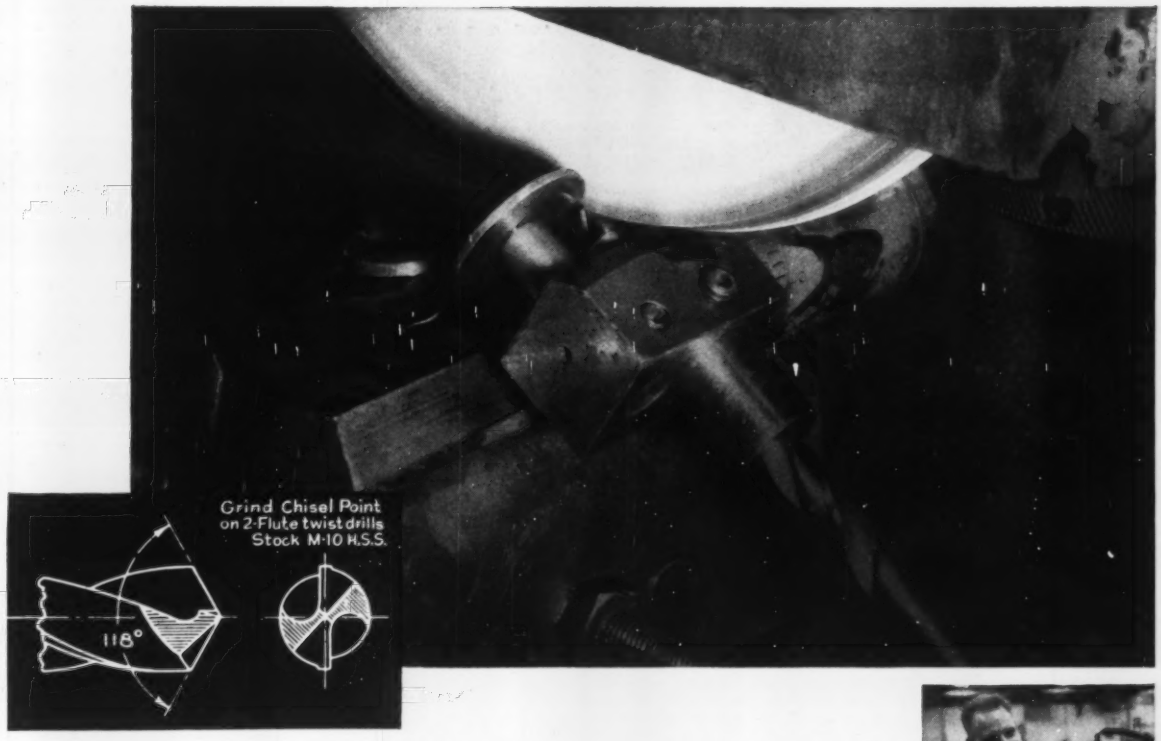
formed aircraft rope and has an overload safety factor of about 100 per cent. The handle is engineered to bend or break before the hoist can be overloaded severely. *Write*: Aluminum Products Inc., P.O. Box 1462, Ft. Lauderdale, Fla. *Phone*: Jackson 2-5761

Fork Truck Lifts 35,000 Lb

The Clarklift Y-350 is designed for heavy lifting and tiering work outdoors. The operator's seat is placed above the left front fender to insure full visibility when a load is raised or placed.



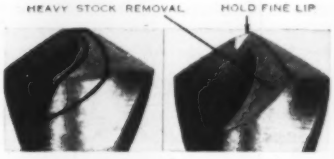
The pneumatic-tired truck has power steering and shifting. The four-speed transmission is coupled with a torque converter. Top speed is 16 mph. *Write*: Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561



A GRINDING PROGRESS REPORT

Bay State Engineer Finds Way to Triple Production on Chisel Point Grinder

The special "chisel point" on a twist drill makes it start faster in hard materials. Grinding it in one cut and at production rates presents a difficult wheel selection problem, as shown.



For one manufacturer, neither wheels soft enough for the heavy cut nor those hard enough for the fine cutting of the lip could meet the production and quality standards. Expensive overtime shifts were being worked when Bay State was called in.

Bay State District Manager Bob Belmont saw, in this one operation, two grinding tasks so different that one set of wheel "specs" could not possibly do them both.

The "sandwich" wheel illustrated below, with two layers of different abrasives, was his answer. The hard (P grade), fine (220 grit) layer grinds the fine lip. The coarser (150 grit), softer (N grade) side does the heavy cutting.

Bob Belmont demonstrated capable engineering in action. He tripled production, reduced rejects, eliminated overtime, and lowered grinding costs.

To get such effective engineering aid, contact any distributor or office of the Bay State Abrasive Products Company, Westboro, Massachusetts.

Branch Offices are located in Bristol, Conn.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Pittsburgh, Pa.; with distributors in all principal cities.

In Canada: Bay State Abrasive Products Co.; (Canada) Ltd., Brantford, Ont.

BAY STATE
WHEELS of PROGRESS

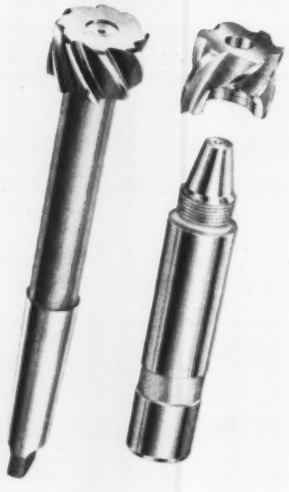
*Now they call Joe a genius**

*He's no Einstein—but he figured how to cut costs in half by switching to . . .

NEW T-J REAMERS
with *throw-away heads!*

You don't have to be a wizard at figures to see how the new T-J Reamer with Throw-Away Head cuts your replacement costs to *less than half.* You *save* because you replace *only* the part that wears out. Buy original shank . . . change the head in a jiffy when worn. Wide range of head sizes from ½" to 2¾" inclusive, in 1/16" increments available with right or left hand spiral flutes for thru or blind hole reaming.

Tapered hole in head insures concentricity and *new* thread design assures a snug fit on smoothly ground tapered shank. Reamer operates free from binding or sticking due to cutting portion wearing undersize and creating negative relief. It's a product of T-J's 39 years of know-how as one of the largest manufacturers of die sinking milling cutters. Tomkins-Johnson Co., 617 North Mechanic St., Jackson, Mich.



Left hand spiral, right hand cut. Right hand spiral, right hand cut.

1—Cuts replacement cost to less than half!
2—Quick change of heads saves time.
3—Easy to change heads for different metals, increases efficiency.
4—Head and arbor firmly locked together.
5—Wide range of sizes.

★Exclusive, high potential territories open to responsible manufacturers representatives. Write today!

T-J TOMKINS-JOHNSON
RIVITORS · AIR AND HYDRAULIC CYLINDERS · CUTTERS · CLINCHORS

NEW Literature

Write directly to the company for a copy

Marking Machines

A series of bulletins describes general purpose marking machines—from small bench-mounted models for light duty to machines capable of marking with up to 6 tons of table pressure. Jas. H. Matthews & Co. Inc., 3942 Forbes St., Pittsburgh 13, Pa.

Coil Cars

Bulletin 562, 6 pages, describes heavy duty coil cars used to load and unload reels. Herr Equipment Corp., Warren, O.

Spring Steels

This 48-page catalog describes the qualities of cold-rolled spring steel and tells how the steel is rolled, annealed, slit and filed, hardened and tempered, polished, colored and inspected. Wallace Barnes Steel Division, Associated Spring Corp., Bristol, Conn.

Magnetic Separation

Design and application of high intensity induced roll magnetic separators is discussed in bulletin MIB-103, 4 pages. Carpco Mfg. Inc., P.O. Box 3272, Jacksonville 6, Fla.

Stainless Fabrication

This 40-page manual, Adv. 590a, describes the latest techniques for fabricating stainless steel. Advertising Division, Republic Steel Corp., 3100 E. 45th St., Cleveland 27, O.

Industrial Gloves

Here's a 12-page bulletin that tells how the analysis of glove use cuts costs. Jomac Inc., Philadelphia 38, Pa.

Magnet Controllers

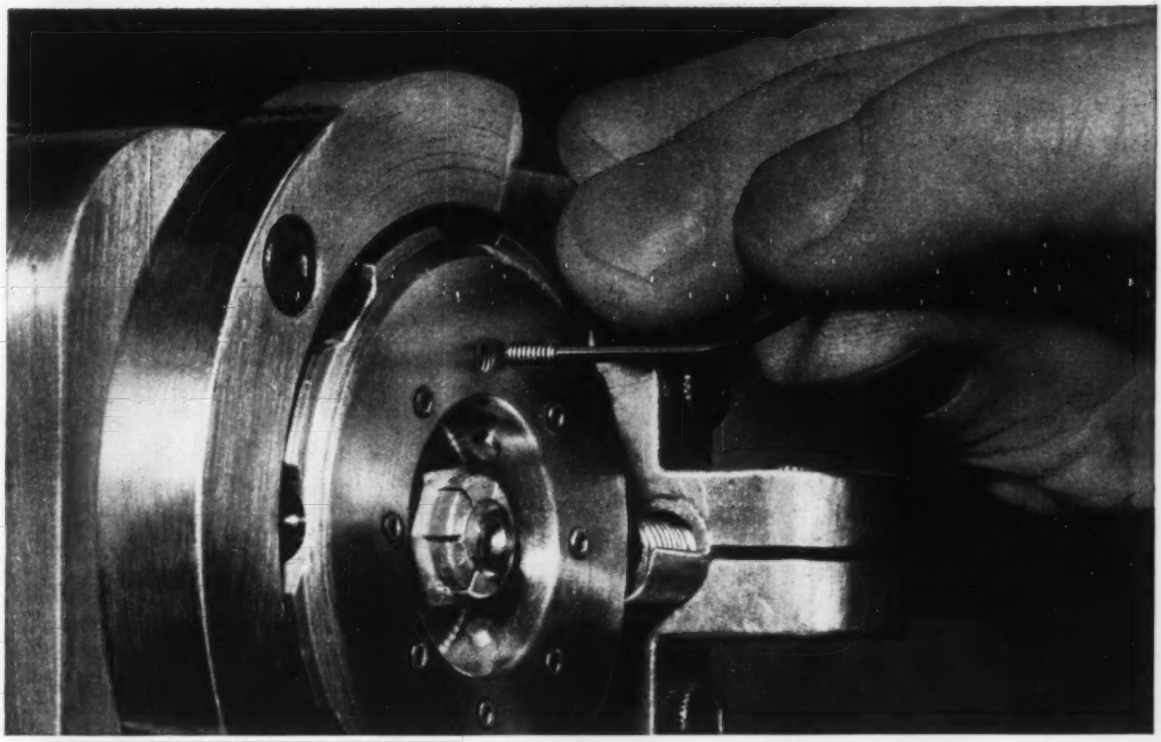
Controllers for operating 45 to 80 in. lifting magnets are depicted in bulletin MC-143, 2 pages. Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, O.

Microfilm

This 35-page bulletin contains case histories, product and application information on new developments in microfilm. Filmsort Division, Dexter Folder Co., division of Miehle Printing Press & Mfg. Co., Pearl River, N. Y.

Sockets

Bulletin 129, 8 pages, describes a line of sockets for high-speed nut running and a line for use where



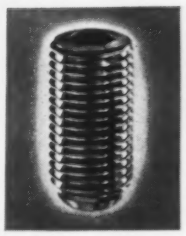
Microsize UNBRAKO socket screws simplify design problems—even in highly specialized equipment like this prototype precision loading device for use in advanced automated production operations.

Miniaturize with UNBRAKO set screws

HEAT-TREATED ALLOY STEEL*
PLAIN CUP POINT
Class 3 Fit Standard

Diameter	Threads per inch NC	Threads per inch NF	L Overall Length	Recommended Installation Torque in Inch-Pounds NC	Recommended Installation Torque in Inch-Pounds NF	Weight per Box of 100 in Pounds
#0 D .060 F .028	..	80	1/16	..	.5	.01
	..	80	3/32	..	.5	.01
	..	80	1/8	..	.5	.01
	..	80	5/32	..	.5	.01
	..	80	3/16	..	.5	.01
	..	80	1/4	..	.5	.01
#1 D .073 F .035	..	72	1/16	..	1.5	.02
	..	72	3/32	..	1.5	.02
	..	72	1/8	..	1.5	.02
	..	72	5/32	..	1.5	.02
	..	72	3/16	..	1.5	.02
	..	72	1/4	..	1.5	.02
#2 D .086 F .035	56	..	1/16	1.5	..	.03
	56	..	3/32	1.5	..	.03
	56	..	1/8	1.5	..	.03
	56	..	5/32	1.5	..	.03
	56	..	3/16	1.5	..	.03
	56	..	1/4	1.5	..	.03
#3 D .099 F .050	48	..	3/32	5.0	..	.04
	48	..	1/8	5.0	..	.04
	48	..	5/32	5.0	..	.04
	48	..	3/16	5.0	..	.04
	48	..	1/4	5.0	..	.04

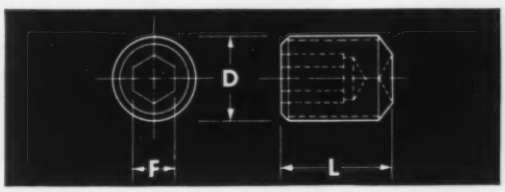
*Also available in stainless steel



You need not design special set screws to secure your new miniaturized equipment. Microsize UNBRAKOS were developed specifically for use in modern small devices.

UNBRAKO screws are made of carefully selected alloy steel. They are manufactured to timepiece precision. Sockets are deep and uniform for greatest wrench engagement and longest reuse. Threads are fully formed for maximum strength and exact fit. And UNBRAKOS are heat treated to the optimum condition for high tensile strength and ductility without brittleness or decarburization.

Ask your authorized industrial distributor about microsize UNBRAKO socket screws today. Or write us for Bulletin 2055 and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.



STANDARD PRESSED STEEL CO.

UNBRAKO® SOCKET SCREW DIVISION SPS

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76 MILLION welding rods through these **CROMOVAN** feed rolls!

36 months service and still going strong!

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You, too, can realize comparable savings, reduced maintenance, and higher production when you adopt CROMOVAN for feed rolls, guides and wear parts. Write for Technical Bulletin 20-010 or 20-011 (Free Machining), today.

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R-318

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VISIT OUR BOOTH NO. 937-A — WESTERN METALS SHOW, LOS ANGELES

perfect alignment of socket and nut or bolt is not always possible. Apex Machine & Tool Co., 1032 S. Patterson Blvd., Dayton 2, O.

Optical Aids

Ways in which optical instruments can simplify and speed manufacturing and inspection operations are outlined in bulletin D-1059. Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.

Fork Trucks

Bulletin BU-305, 20 pages, describes fork lift trucks, towing tractors and platform trucks. A line of clamping attachments for lift trucks is presented in bulletin BU-387, 8 pages. Materials Handling Division, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Heavy Duty Lathes

Lathes which feature automatic calculation and setup of spindle speeds plus hydraulic shifting are covered in bulletin 1603, 16 pages. Monarch Machine Tool Co., Sidney, O.

Basic Brick

This 48-page manual tells how to install basic brick and ramming mixes in electric steelmaking furnaces. Department 257, Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, Oakland 12, Calif.

Heat Treating Furnaces

Standard rate continuous furnaces are depicted in bulletin SC-177, 4 pages. Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.

Magnesium and Titanium

This 44-page design manual covers many properties of titanium and magnesium, including mechanical properties at elevated temperatures, forming characteristics, corrosion behavior, machining and welding. Brooks & Perkins Inc., 1950 W. Fort St., Detroit 16, Mich.

Parts for Jigs and Fixtures

Bulletin 26, 4 pages, covers 400 components including toggle shoe clamps, bolts, screws, studs, nuts, washers, fixture keys and hand knobs. Northwestern Tool & Engineering Co., 131 Hollier Ave., Dayton 3, O.

Pressure-Sensitive Tape

Uses for printed and die-cut tapes are presented in this 6-page bulletin. Department L7-48, Minnesota Mining & Mfg. Co., St. Paul, Minn.

Grinders

Floor and bench model tool grinders and a surface grinder which is also used as a chip breaker grinder

JOLIET WASHERS

To *Purchasing* men who have helped make Joliet "first" we are proud to announce the completion of a very extensive plant expansion program. New facilities provide the reserve capacity and flexibility to meet any increase in both your regular or any emergency *immediate shipment* requirements. Continue to look to Joliet for washers of all types—standard and special, any size, any metal, any quantity.

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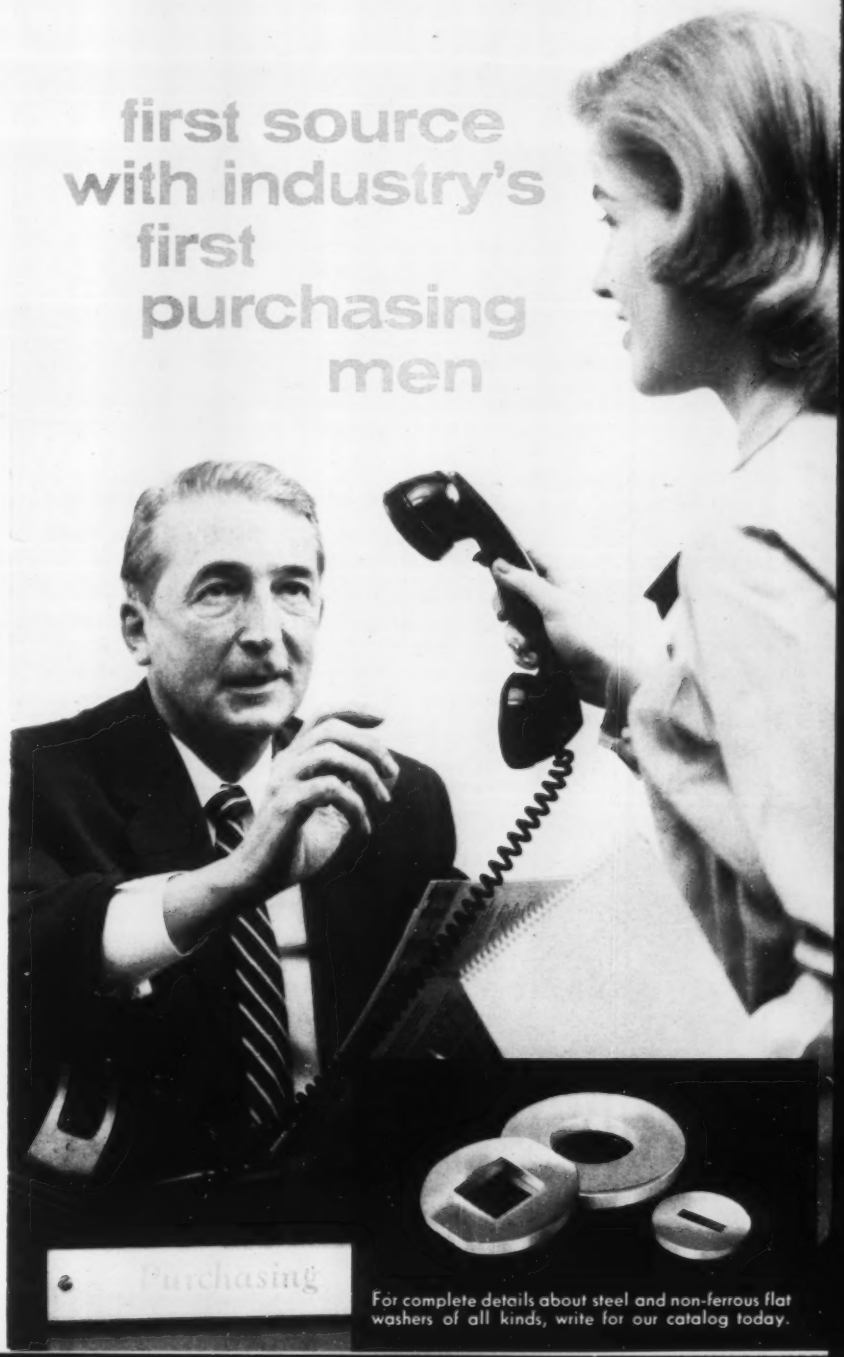

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NEW LITERATURE

or a tool and cutter grinder are described in an 8-page bulletin. Walker-Turner Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh, Pa.

Heat Control

Bulletin S 001-6, 2 pages, describes spring loaded thermocouples for use where the measured surface may tend to move. Indicating pneumatic controllers for temperature and pressure are covered in bulletin C 600/700 1. Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave., Philadelphia 44, Pa.

For Used Tool Buyers

This booklet tells how to buy used machine tools. S & S Machinery Co., 140 53rd St., Brooklyn 32, N. Y.

Gages

This 40-page catalog lists sizes and specifications of a line of thread plug, thread ring and special gages. Cadillac Gage Co., P.O. Box 3806, Detroit 5, Mich.

Silicones

The 12-page guide depicts the variety of silicone uses. Dow Corning Corp., Midland, Mich.

Tin-Lined Pipe

Bulletin 139, 4 pages, describes a line of pipe fittings, valves, faucets and accessories lined with tin to protect distilled or demineralized water from metallic contamination. Barnstead Still & Demineralizer Co., 235 Lanesville Terrace, Boston 31, Mass.

Carbide Tools

This 12-page bulletin gives detailed information on a line of toolholders and throwaway carbide inserts. Advertising Department, Allegheny Ludlum Steel Corp., 20th Floor, Oliver Bldg., Pittsburgh 22, Pa.

Automatic Controls

Catalog 857, 56 pages, lists pressure, temperature, liquid level and mechanical movement controls which use sealed mercury contacts. Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.

Screw Conveyor Parts

Ball bearing components for screw conveyors are described in bulletin 2489, 6 pages. Department PR, Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Centerless Lapping

Bulletin G-683, 12 pages, describes centerless lapping machines that hold diameter tolerances of 0.000025 in. Cincinnati Milling Machine Co., Cincinnati 9, O.

OVER-DESIGNING ?

If you are designing bronze parts for mass production, there is a good chance that you are specifying a more costly alloy than you need.

ASARCO's patented continuous-casting process produces alloys according to SAE, ASTM and Government specifications. But their performance is entirely unlike that of similar alloys cast in sand or permanent molds. Relatively low-cost alloys cast by the ASARCO process perform like more expensive alloys cast by other methods.

For example, compare Continuous-Cast SAE 660 (ASARCON 773) with more expensive sand-cast alloys:

	Typical Yield Strength	Typical Impact Strength	Brinell Hardness
ASARCON 773	27,000 psi	12.5 ft.-lbs.	72
Sand-Cast SAE 62	20,000 psi	8.7 ft.-lbs.	65
Sand-Cast SAE 64	17,000 psi	8.2 ft.-lbs.	62

Unless you've checked to see whether the unique ASARCO bronzes can give you what you need, there's a possibility that you're over-designing. You may even be able to replace aluminum and manganese bronzes with low-cost ASARCON Continuous-Cast bronzes under certain conditions. Over-designing can be expensive in mass production, even if you are spending only a penny or two extra per pound of bronze.

ASARCON 773 (SAE 660) is readily available from stock in a wide range of sizes. An added bonus is the fact that ASARCON 773 is exceptionally free-machining. Rods, tubes, and numerous "extruded" shapes up to 9 inches in diameter are cast to order by ASARCO in more than 20 alloys.

We'll be happy to send you a free booklet describing the process and the product.

Continuous-Cast Products Department

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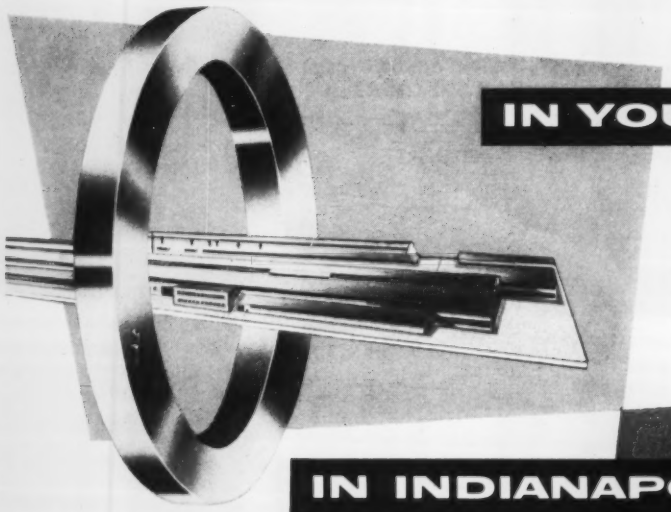
TRY CMP's 3 IN 1 SERVICE

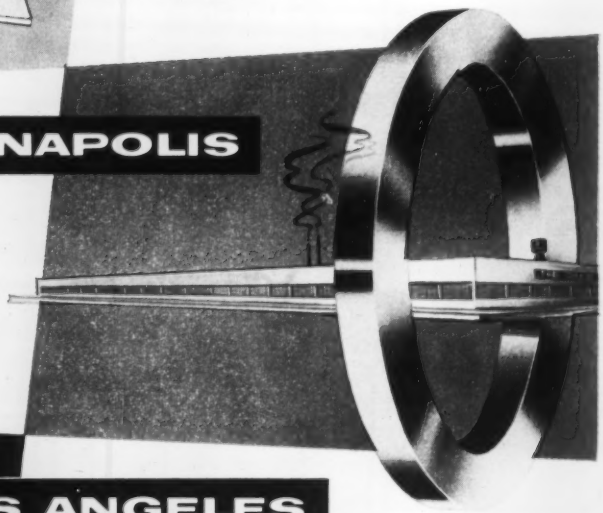
FOR RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL

Now there are 3 CMP plants equipped with today's most effective rolling and processing facilities for the production of "restricted specification" cold rolled strip steel. Strategic plant locations provide CMP customers with the security of 3 sources of supply, plus the opportunity for close working relationships which these local production centers make possible.



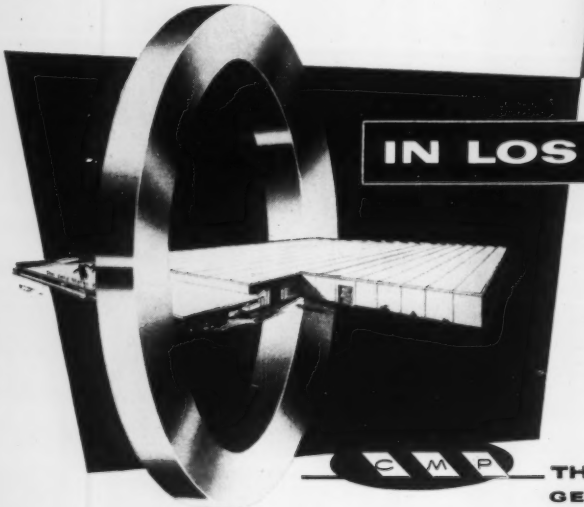
IN YOUNGSTOWN

General office headquarters and production facilities where CMP pioneered the processing of "restricted specification" cold rolled strip steel. Laboratory and research facilities are also here, staffed for continuing development and improvement of CMP products.



IN INDIANAPOLIS

Geographically situated to conveniently serve the fast growing midwestern market for specialized cold rolled strip, this recently built, all-new plant utilizes identical processing equipment as other CMP plants for producing a wide range of "restricted specification" cold rolled strip.



IN LOS ANGELES

Latest addition to CMP's producing facilities is this Los Angeles unit, the only plant in the West with CMP-type equipment. Faster service for West Coast steel fabricators, plus the know-how of steel mill-trained personnel provide a service opportunity not heretofore locally available.

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STEEL

March 11, 1957

Market Outlook

THOUGH demand has lost some of its bounce, steel business is still good. The volume of new orders is expected to improve in the second quarter, especially during May and June.

"The outlook is for continued good business," Chairman J. L. Mauthe and President A. S. Glossbrenner, Youngstown Sheet & Tube Co., told stockholders. They think there's nothing in the current business picture to indicate more than moderate fluctuations in steel operations. Most steel industry leaders agree.

OPERATIONS SLIP—Lending support to this confidence, furnaces continue to pour metal in heavy volume. Although the national ingot rate was down 2 points to 95 per cent of capacity last week, output was equal to around 2,430,000 net tons. That's only slightly under the 2,462,000 tons turned out in the like week a year ago, and compares with the record 2,525,000 tons produced in the week ended Dec. 23.

Steelmakers are not unmindful that the current trend is downward. Some even think the rate may fall farther before the trend is reversed. But even if fluctuations come over the next several weeks, look for a seasonal demand pickup from several consuming directions early in the second quarter.

INVENTORIES SHRINKING—It's pretty certain that consumers' stocks in various lines, including automotive, are being worked off fairly rapidly. Eventually, this will mean a surge in buying, but probably not until the latter part of the second quarter.

Sheet steel buying is still lagging, but less rapidly than it was. This is regarded as reflecting a closer balance between consumer inventories and needs, an adjustment due more to gradual working off of stocks than to any particular improvement in consumption.

SUPPLIES IMPROVE—Something of an easier situation is developing in plate supplies. Improvement is due to increased tonnage of light gage material coming from the strip mills. Benefiting principally by the larger offerings of strip plate are the railroads and freight car builders.

There is only slight betterment in supplies of heavy plates, and the shortage of this item promises to continue for months to come.

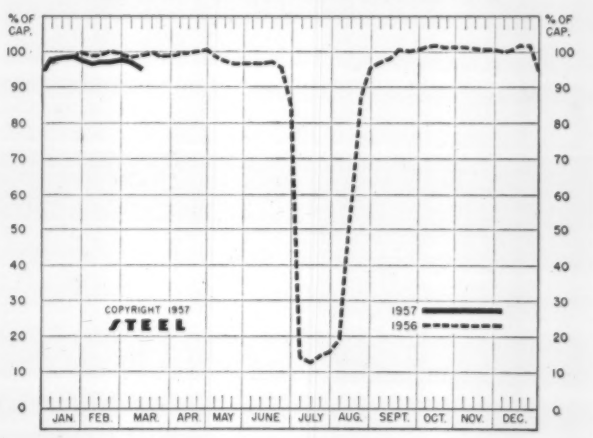
PRICES RISING—Finished steel continues to move into higher ground in several product categories, including cold-finished spring steel, wire products, rails and other railroad items. In a couple of instances, prices have been reduced—copper clad strip (reflecting lower copper prices) and rail steel bars.

The most significant price change last week involved pig iron. It was increased $2 a ton to offset recent increases in costs.

INDEXES RISE—The advances on the various steel products raised STEEL's index on finished steel to 227.41 from 227.10. The arithmetical composite held at $139.51 because none of the products in that compilation was affected last week. The pig iron composites rose to $63.70 on No. 2 foundry iron, $63.24 on basic and $64.49 on malleable.

Scrap prices dropped for the thirteenth consecutive week. The composite on steelmaking grades now stands at $51.67, against $52.50 a week ago, and $66.17, the peak in December.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

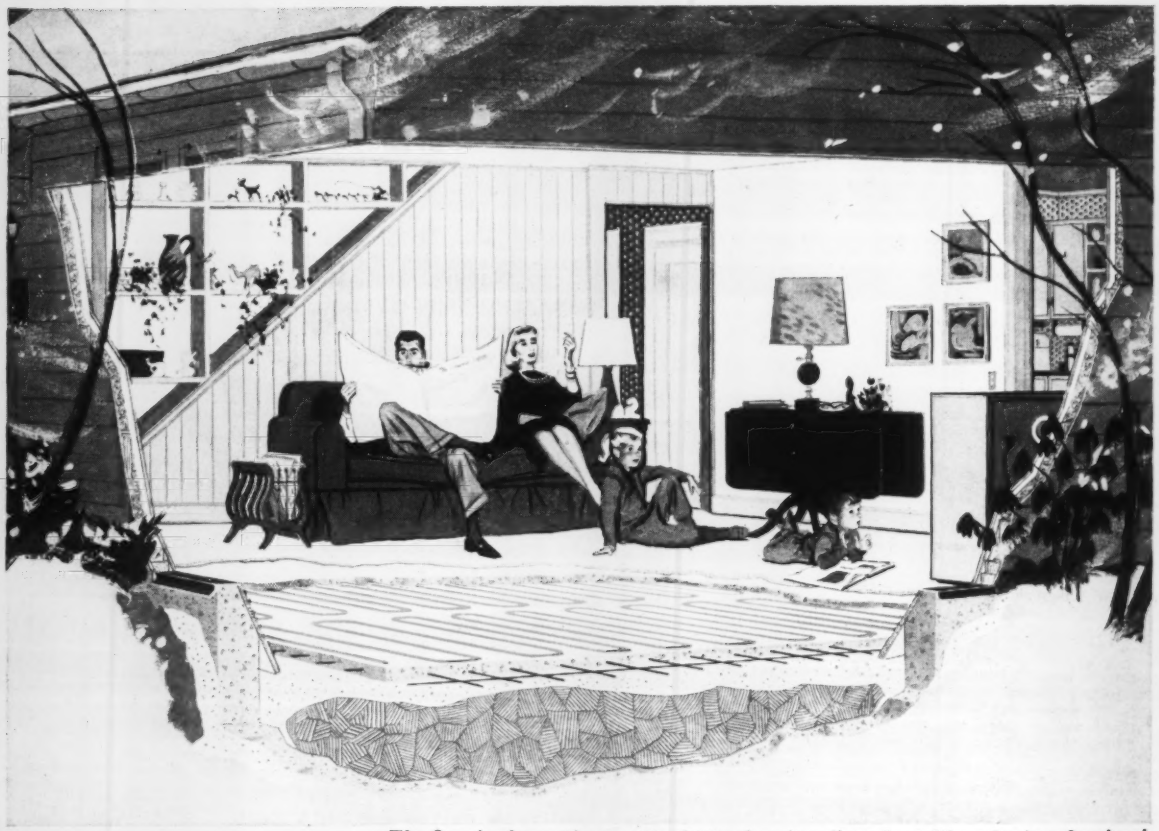
	Week Ended Mar. 10	Change	Same Week 1956	Same Week 1955
Pittsburgh	96	— 2	102.5	93.5
Chicago	95.5	— 0.5*	100.5	97.5
Mid-Atlantic	99.5	0	100	89
Youngstown	94	— 4	97	95
Wheeling	97	— 4	96.5	92.5
Cleveland	92.5	— 4*	103.5	97
Buffalo	100	0	105	92.5
Birmingham	95.5	— 2.5	96	86.5
New England	67	— 1	75	80
Cincinnati	83	—10	97.5	85
St. Louis	95.5	+ 2	106	96
Detroit	100.5	— 2	100.5	88
Western	104	— 1	104	96
National Rate	95	— 2	99	91.5

INGOT PRODUCTION‡

	Week Ended Mar. 10	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	151.2†	152.9	154.7	153.3
NET TONS (In thousands)	2,429†	2,456	2,485	2,462

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 105 Technical Outlook—p. 153



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Instead of warming the air around you...

COPPER warms you!

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If your Company seeks to make progress in conducting, transferring, radiating *heat*, you'll be able to get the COPPER you need . . . because the Copper Industry is expanding its capacity every year to make sure you get it!

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COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES: Best conductor of electricity commercially available • Does not rust . . . high corrosion resistance • Best heat transfer agent of all commercial metals • Easy to machine, form, draw, stamp, polish, plate, etc. • Welds readily . . . excellent for soldering and brazing

Citizens Gas & Coke Utility.

Coke: Look for Price Rise

Coal mine operators will boost their prices on Apr. 1. This, plus higher costs of production, may force an increase of 35 cents a ton on the foundry grade

CONSUMERS of metallurgical coke will find supplies adequate and deliveries prompt this year, but it is likely they will pay more for it. Increasing costs of production and higher coal prices will be responsible.

Coke quality will remain high because supplies of coking coal appear secure for some years ahead. In addition, coal beneficiation practices are improving and becoming more general.

Coke has three primary uses: In blast furnaces, in foundries and in manufacturing producer gas and water gas. Last year, coke shipments totaled 73,753,854 tons. Blast furnaces took 90 per cent, foundries 4 per cent. Although foundries used only 2,849,785 tons, they represent an important market operation.

Getting Better—On a long-term basis, demand for foundry coke has been increasing at the rate of 2 per cent a year. Over-all, there has been improvement in demand for this grade since the fourth quarter last year, and January and February sales averaged about 5 per cent better than those of the comparable months in 1956. Country-wide, the situation is spotty. In the East, gray iron foundries are lagging. Ingot mold foundries are busiest in the Pittsburgh area, but other foundries report slow operations. In Detroit, the outlook is improving on the basis of the moderately improved automotive situation. Output of farm machinery in Chicago is picking up but not enough to offset a reduced demand for other castings. Despite this softer outlook at the moment, some observers feel foundry coke demand will reach 3 million tons this year.

Delivery of foundry coke to consumers is more prompt today than it has been for some time. A three or four day delay in delivery is unusual. Merchant cokemakers are operating at close to capacity, partly because of demands from the steel industry for blast furnace fuel. On a yearly basis, they may operate at about 90 per cent of merchant capacity.

Price Pressures—Opinion is divided on whether foundry coke prices will hold or advance during the next six months. One group feels it will be necessary to raise them to compensate for raw material and wage increases. They feel this is certain now that coal mine operators have announced a 25 cent a ton boost for coal effective Apr. 1. Producers feel coke could advance 35 cents a ton or so at the same time.

Other observers feel there is a growing resistance to the higher prices which are being imposed on the metalworking industry. If business continues to ease sufficiently, there might be at least a temporary check to this trend in some lines, including coke. A few believe that little price change can be expected even when coal prices go up. They reason that most cokemakers figured this next price increase into their last boost of $1 to $1.25 a ton in January.

Least Worry—Suitable coking coal is in free supply, but a short-

age of low-volatile coals is a long-term danger. In recent years, there have been numerous attempts to upgrade both coal and coke. The foundry coke of today is of far better quality than that available before World War II. Great strides in coal beneficiation are responsible for the excellent quality of coke for blast furnace and foundry use.

No expansion in merchant coke oven capacity is under way or planned. There are several reasons.

First, there is a diminishing need for coke oven gas for public utility use because of the growing inroads of natural gas supplies. Without a market for the gas, oven operators find production of coke uneconomical.

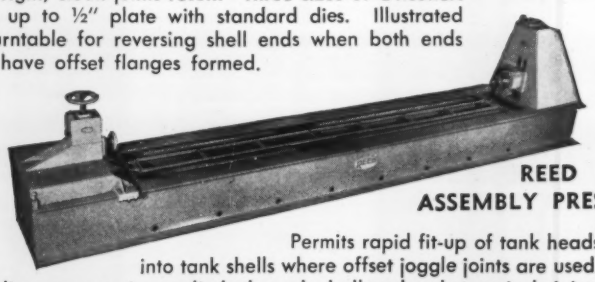
Second, a number of merchant coke ovens are quite old, and to replace them at present construction costs would be prohibitive. To amortize new facilities, it has been estimated foundry coke would have to sell for around $45 a ton—the present oven price is around $30. So there is a disposition to drop old ovens as they wear out.

Third, if the automobile industry switches to turbine engines, which is unlikely before 1960, there will be a reduction in foundry coke demand. Fewer gray iron castings will be needed for piston engine blocks.

WEBB TANK PRODUCTION MACHINERY

REED OFFSETTER

This machine forms an offset flange around shell ends to facilitate automatic welding of tank heads. It eliminates chill rings, decreases fit-up time, improves the concentricity of shell ends, and aids in reducing actual welding time. Tight, clean joints result. Three sizes of Offsetters handle up to ½" plate with standard dies. Illustrated with Turntable for reversing shell ends when both ends are to have offset flanges formed.



REED ASSEMBLY PRESS

Permits rapid fit-up of tank heads into tank shells where offset joggle joints are used. Hydraulic pressure is applied through ball-and-socket swivel joints that allow the head cups to set to the head. Hydraulically powered kick-outs speed up loading and unloading. Both headstock and tailstock are adjustable vertically; tailstock is also adjustable along the bed for various lengths of vessels up to 18'.

Fit-up rolls are also available to facilitate proper alignment and assembly of shells lacking rigidity.

Horn Type Fixtures | Cylinder Flange Offsetters | Assembly Fixtures | Unit Type Turning Rolls | Portable Turning Rolls | Automatic Welding Track Supports

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REED EQUIPMENT DIVISION
THE WEBB CORP. WEBB CITY, MO. U. S. A.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 245

Coke releases for March show improvement over those in February. Because business activity so far this year hasn't come up to expectations, it appears that foundries deferred some fuel shipments while they used up tonnage on hand. Coke sellers think this inventory adjustment is over and that shipments in the next few weeks will be a more accurate index of castings output than they have been recently.

December production of coke (oven and beehive) totaled 6,835,884 net tons, reports the Bureau of Mines. This was an increase of 4.6 per cent over November output, 6,533,126 tons, and compared with 6,882,300 in December, 1955.

Of the total ouput during the month, 6,615,935 tons were oven coke, and 219,949 tons, beehive. This compares with 6,650,900 tons of oven coke and 231,400 tons of beehive, in December, 1955.

Total production last year was 74,380,456 net tons, of which 71,936,499 tons were oven coke and 2,443,957 beehive.

Steel Bars . . .

Bar Prices, Page 239

Demand for hot-rolled carbon bars is described as "fair to good." Some consumers do not want all the mill tonnage offered them. Others want more. In general, consumers of the heavier rounds and flats, particularly flats, are the most active.

Over-all, the demand trend appears a shade easier on nearby requirements, stronger on future needs. In fact, consumers are specifying more actively for May and June than they are for April. Interpretation: Excess inventories will likely be worked off by the end of April.

Inquiry for cold-finished bars

and hot and cold-finished alloys is spotty. Demand, generally, is fair. Some cold-drawn bar mills are still filling March orders. They anticipate a pickup in automotive sales next quarter.

Youngstown Sheet & Tube Co. has increased alloy grade extras on cold-finished alloy steel bars. Sweets Steel Co., Williamsport, Pa., reduced prices on hot-rolled rail steel bars and angles $10 a ton, effective Mar. 1.

Wire . . .

Wire Prices, Pages 241 & 242

Despite the approach of spring, sellers of merchant wire products say that they have noted little improvement in demand. The lag in demand for manufacturers wire continues.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 240 & 241

Sheet steel buying is still declining, but at a slower pace than recently. This is thought to reflect attainment of closer balance between consumers' inventories and needs. Generally, better balance is due to the gradual working off of stocks rather than to any improvement in consumption.

The leveling off in the downtrend applies to hot and cold-rolled sheets. It is even more pronounced in galvanized, largely because demand for that product has been at such low ebb right along. In fact, some sellers express disappointment at current improved volume. They anticipated a more spirited upswing as spring neared.

Eastern sellers say inquiry for cold-rolled remains slow, but that hot-rolled sheets are in noticeably better demand. Excess inventories appear to have been worked off pretty well in the area, and, in general, there appears to be some pickup in fabricating operations. To certain extent, this also applies to cold-rolled sheets. Specialties are moving sluggishly, except for high silicon and stainless sheets.

One major Pittsburgh mill thinks March and April sheet production will be lower than it was in early first quarter. March, contrary to the usual seasonal trend, is expected to be the slowest first quarter month in hot-rolled, cold-rolled and galvanized sales.

Demand from the auto builders and appliance makers is expected to remain at the March level early in the second quarter, with sales improving in May and June. The auto builders are said to be insisting on receiving tonnage no later than promised delivery dates. This is seen as indicating that their steel inventories are being held close to requirements.

Virtually all producers of cold-rolled spring steel strip have now advanced their prices.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 239

Concrete reinforcing steel bar volume is heavier with forward buying, including highway mat, minimizing the seasonal lag in shipments. Bridge requirements are bolstered by increased tonnage for buildings. In numerous cases, designs are changed from structural steel to concrete construction, largely due to the shape shortage.

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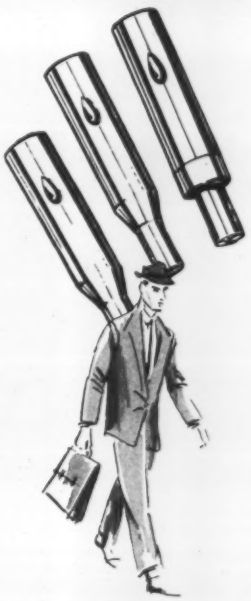

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England, 14 to 18 cents per pound for bars in place is quoted on bridge and detailed engineering projects.

Steel piling deliveries extend about a year and inquiries for this product are reported to be mounting at several points.

In the Pacific Northwest, reinforcing bar fabricators and mills anticipate active demand in the second quarter. Buying the last several months has been slow, but mill backlogs are reported substantial.

Tubular Goods . . .

Tubular Goods Prices, Page 243

Standard pipe sales continue to decline, but most other tubular products are moving in large volume to consumers. An upswing in standard pipe demand is expected during the second quarter as the seasonal surge in building begins to be felt by suppliers. When this occurs, the pipe mills will be working at capacity.

Oil country tubular goods suppliers are surprised by the strength of second quarter demand. Most of them are sold out for the entire period. But they are not under quite the pressure they were some months back.

One Pittsburgh area pipemaker expected a reduction in sales of seamless tubular goods. But this mill has no open tonnage to offer for second quarter shipment.

With the improvement in weather in the western states and in Canada, more rigs will be brought into operation. Drillers who have not placed second quarter tubing orders may find later placement difficult.

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Tin Plate . . .

Tin Plate Prices, Page 241

Tin plate users are rushing orders to mills for delivery before the end of April in apparent expectation of a price increase at that time. As a result, demand and production have been heavy this quarter.

Shipments are increasing, although much of current production is going into inventories at mills and warehouses for shipment later this year.

Production will remain strong in April, but a change may occur in customary second quarter buying patterns. Canmakers usually increase their ordering in May and June to build up stocks in event of a steel strike. With that threat removed, one major producer expects canmakers to even out their buying between the second and third quarters. There will be no sudden splurge of orders in May and June.

Warehouse . . .

Warehouse Prices, Page 244

Apart from sheets, major tonnage products are moving well from warehouses. Plates and shapes are in particularly good demand, with sales limited only by incoming shipments from the mills. Demand for hot-rolled carbon bars is somewhat heavier than it was a few weeks ago.

Seasonal factors are exerting an influence on some products. Interest in chain link fence and barbed wire is gaining momentum. Products used in construction are in heavier demand.

The reduction in inventories of

bars and sheets which has been under way for many weeks is expected to run its course by early next quarter. Most bar fabricators are resisting recent increases in extras. They are buying as few of the higher-priced bars as possible.

Distributors are running into stiff price competition in selling cold-rolled sheets. Some material has sold at cut-rate prices, as much as $20 to $30 a ton under published quotations, depending on quality. A substantial part of the low-priced offerings is made up of seconds, but some prime sheets also are involved.

Plates . . .

Plate Prices, Page 239

Some letup in tank buying is noted, but fabricators report enough work is coming out to sustain shop backlogs. They regard the lull as temporary because of the heavy volume of projected work. Oil company expenditures will be large this year, and considerable water tank business is in prospect. Industrial requirements for water tanks may be off from last year's, but municipal needs may possibly be larger.

Steel supply continues a bottleneck. Easing in light plates due to freer strip mill offerings is helping to relieve the situation, but heavy plates are tighter than ever. One eastern fabricator of water tanks says that on the basis of present bookings and the outlook for steel supply, he cannot promise delivery on larger tank work much before seven or eight months; on lighter tanks, promises range five to six months.

Approximately 11,750 tons of steel, mostly plates, will be required for 50 steel deck cargo barges which the New York Trap Rock Corp., New York, just placed with the Richmond Steel Co. Inc., Richmond, Va. Salem, Oreg. is considering bids on 7000 tons of plates for a water supply line.

Northwestern Steel & Wire Co., Sterling, Ill., on Feb. 15 put the first slab through its new 16-in. plate and structural mill. The company plans to start production of structural angles this month, then channels, with I-beams following at a later date.

Imported Steel Prices Ease

Prices on steel imported from West European countries are a bit on the easy side, although important reductions are confined to I-beams (25 cents per 100 lb) and basic bessemer plates (30 cents per 100 lb).

Barbed wire prices are up 10 cents per 100 lb, but this cannot be ascribed to any particular buying interest here. It is due to a strong market in other countries.

Channels appear to be moving best in this country. Prices on this item are strong but unchanged.

In general, deliveries, as well as prices, are a little easier. Hot and cold sheets are in ample supply on the other side, with the mills able to make deliveries within 30 to 40 days. Bar angles can also be obtained in the same time. Structural angles, basic bessemer plates and merchant bars take two to three months, but promises are better than they were. Promises on structural channels are well extended.

European open hearth plate de-

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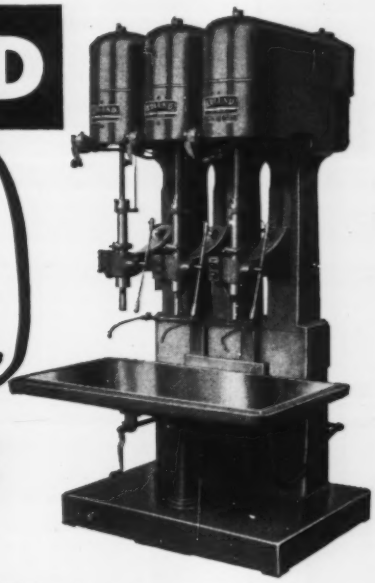
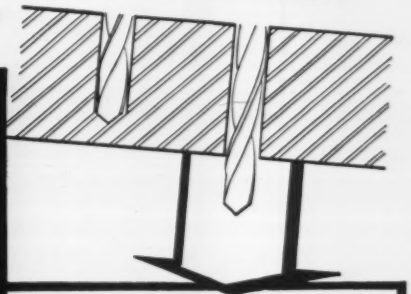


An EDLUND 2F Variable Speed Drilling and Tapping Machine Makes the difference



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*Case history folder #SF on request.

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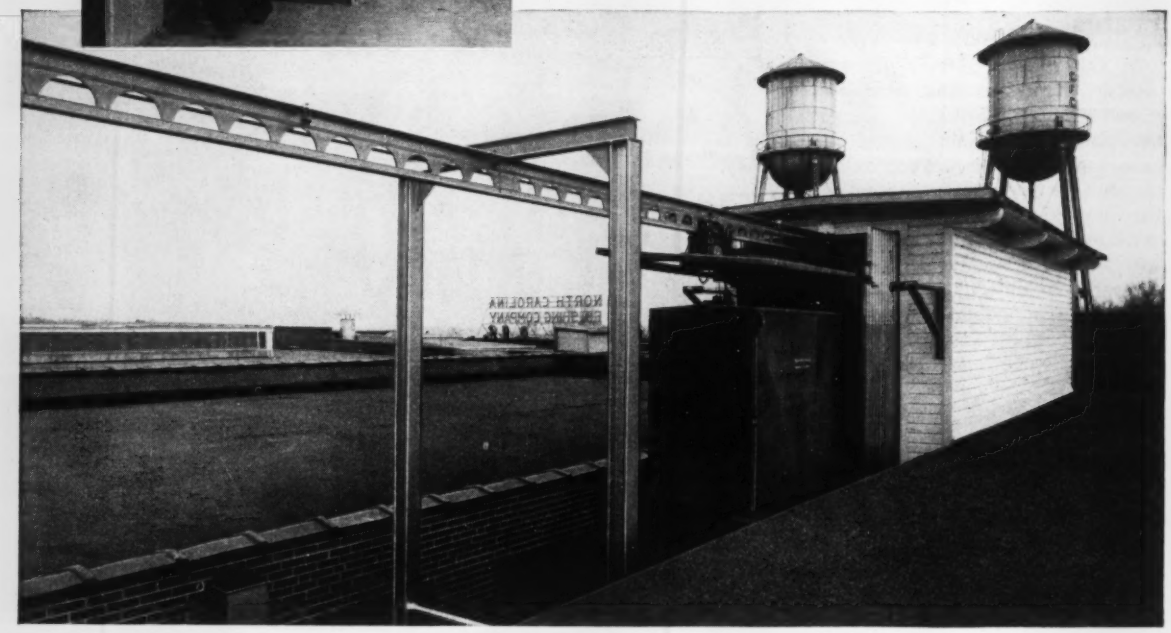
◀ Loading a van on the second floor of a building. This same van also may be lowered to the floor below for loading. Although the building at this end of the system is quite old, the Cleveland Tramrail equipment was easily installed.

For years this vast roof area did nothing more than provide protection from the weather. Now it is being used profitably for materials handling. Illustrated is the van emerging from the penthouse. ▼



BY erecting a Cleveland Tramrail materials handling system over the roofs of its buildings, a large plant is able to transport materials between departments located in widely separated buildings at very low cost.

Because the system operates automatically, the Tramrail carrier travels back and forth without any operator. The carrier van is loaded or unloaded at convenient areas inside the buildings. Pressing a button sends it on its way. It rises vertically to a penthouse on the roof. Then it makes its run over the track system to the penthouse at the other end. Here it lowers to the floor inside for loading or unloading.

The system eliminates considerable floor traffic and saves space required for wide aisleways. It operates at any time, day or night. Inclement weather does not hinder it. The system requires only a fraction of the maintenance necessary for floor handling equipment. It does not wear or damage floors. It is a big aid to safety. In addition to these important benefits, the Cleveland Tramrail system makes tremendous time savings — enough to completely pay for the entire installation every three years.

Cleveland Tramrail has had wide experience in automatic dispatch materials handling systems of many types. Our engineers will welcome an opportunity to work with you.

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liveries are so far extended, and prices are so high that there is practically no market for them in this country.

Semifinished Steel . . .

Semifinished Prices, Page 239

Youngstown Sheet & Tube Co.'s plants produced 5,406,016 net tons of ingots and shipped 3,839,224 tons of steel products in 1956, Chairman J. L. Mauthe and President A. S. Glossbrenner report in the company's annual report to stockholders. This compares with 5,571,556 tons of ingots and shipments of 3,944,492 tons of products in 1955.

The report showed distribution of products was 40 per cent in hot and cold-rolled sheets; 29 per cent, tubular products; 13 per cent, hot and cold-drawn bars; 9 per cent, tin mill products; 3 per cent, rod and wire item; 6 per cent, miscellaneous.

The company spent $79,702,991 for improvements and acquisitions.

Ferroalloys . . .

Ferroalloy Prices, Page 246

Electro Metallurgical Co., division of Union Carbide & Carbon Corp., New York, last week announced several new grades of silicon metal with reduced iron content. The company now offers silicon metal in a range of 0.50 per cent maximum iron up to 1.25 per cent iron.

A maximum 1.00 per cent iron grade is available at the price formerly charged for the maximum 1.50 per cent iron grade, which has been discontinued. A maximum 1.25 per cent iron grade has been established at a price of $0.0025 less than the old 1.50 per cent iron grade. The maximum 0.75 per cent iron grade continues to be available at the same price. A premium grade containing a maximum of 0.50 per cent iron has been established.

Grades of silicon metal and base prices per pound of silicon content, in carload lots, delivered by rail freight, are: Maximum 0.50 per cent iron, $0.2200; max 0.75 per cent iron, $0.1250; max 1.00 per cent iron, $0.2100; max 1.25 per cent iron, $0.2075; low calcium grade, $0.2200; low aluminum grade, $0.2300.

Tool Steel . . .

Tool Steel Prices, Page 243

Braeburn Alloy Steel Corp., Braeburn, Pa., a subsidiary of the Continental Copper & Steel Industries Inc., plans to increase its capacity. The company will install a 1500-ton press, costing $1,250,000, in a new mill building. It will handle ingots up to 10,000 lb. Two electric furnaces in operation at the plant have a capacity to produce 20,730 tons of alloy steel annually .

Structural Shapes . . .

Structural Shape Prices, Page 239

Structural steel requirements for highway construction and schools are increasing, but demand for commercial and industrial building continues to lag. In general, structural steel business is off, in the East. The slack is particularly felt by those shops that are not too well equipped for bridge fabrication.

Most fabricating shops still hold good order backlogs. The smaller fabricators are booked four to five months ahead, medium to larger shops, eight months to a year—even beyond in some instances. Still, some fabricators show uneasiness over the trend and are less selective in their bidding with competition keener pricewise.

Early this year fabricating shops were definitely more concerned about plain material supply than orders. The situation shapes up this way now: Inquiry is easier, or at least not coming out as well as had been anticipated. Supply is better.

Leading shape producers didn't increase their quotas for April on the heavier standard and wide flange sections, and it doesn't seem likely that they will in the immediate future. But, light bar angles, small bars and light plates are in better supply, and there is less concern about the over-all availability of structural steel a few months hence.

New York state closed bids on miscellaneous bridges involving 5557 tons on Feb. 28. The state will take bids Mar. 21 on a still heavier tonnage required for projects costing about $49,520,000. A large amount of transmission tower work is being figured all over the country. On public buildings, schools in particular, the trend continues toward greater use of reinforcing steel.

Proposals covering an estimated 16,637.5 tons of structural steel for 27 toll highway bridges and the erecting of a 1766-ft structure across the Illinois Central Railroad's freight yards at Markham, Ill., were opened recently by the Illinois Toll Highway Commission.

Apparent low bids, totaling $8,644,008, were entered by the Allied Structural Steel Companies, Chicago, and the Bethlehem Steel Co., Bethlehem, Pa.

Contracts involving an estimated 41,186 tons of structural steel previously were awarded or advertised for bids.

Rails, Cars . . .

Track Material Prices, Page 242

U.S. Steel Corp. and its Tennessee Coal & Iron Division increased mill base prices on rails and track accessories. They now quote: Standard tee rails, No. 1 O.H., $5.275 per 100 lb; light rails, $6.25; tie plates, $6.275; joint bars, $6.60; track spikes, $9.225.

Increases average less than 4 per cent. The new schedule became effective Mar. 1.

Colorado Fuel & Iron Corp., Denver, and Inland Steel Co., Chicago, announced similar action. Bethlehem Steel Co., Bethlehem, Pa., initiated the move a week ago.

U.S. Steel Export Co. announced upward revisions in export price bases on standard rails, light rails and accessories, to reflect the domestic price increases. They went into effect Mar. 2.

A group composed of the M. S. Kaplan Co., Chicago, the Commercial Metals Co., Dallas, and the Benjamin Schwartz Co., New York, has acquired the Puerto Rican National Railroad for a reported $3 million. The narrow gage road, owned by the Puerto Rican government, went bankrupt last August and has not operated since.

The Kaplan company and its associates acquired about 360 miles of road, including 240 miles of main line track, and about 2000 freight cars, 100 diesel locomotives, all shop equipment, bridges, ties and other facilities.

Dismantling is expected to take

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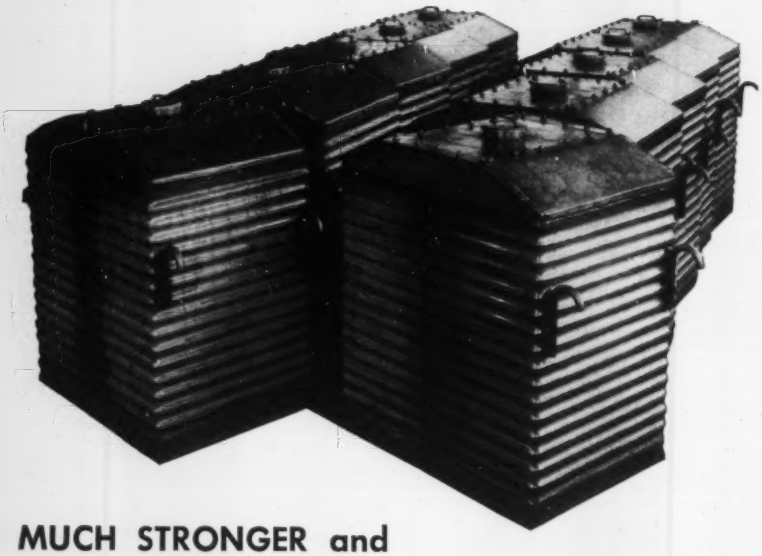

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nine months to a year. All salvageable rails and other equipment will be sold to other West Indian and South American countries.

The railroad operated between San Juan and Ponce, and circled most of the island, with many spurs running to sugar plantations. Motor transport will take its place.

Pig Iron . . .

Pig Iron Prices, Page 244

Most pig iron producers advanced prices $2 a ton last week. Those operating blast furnaces in the Birmingham district held prices unchanged, and a few large producers in the North had taken no action up to presstime. Differentials for silicon and manganese were revised.

Reaction to the upward revision was extremely light in most districts. An adjustment had been expected in view of the 60-cent boost in 1957 ore prices and other higher costs, including those on coal.

Reflecting a further easing in foundry operations, merchant iron sales in the East continue to decline. Some foundries are operating no better than four days a week. With few exceptions, those operating five days a week are doing so with restricted working forces. Their purchases of iron are largely on a hand-to-mouth basis.

In the Mid-Atlantic district, requirements of the steel and malleable foundries are fairly well sustained, but gray iron shops are operating at a definitely lower rate.

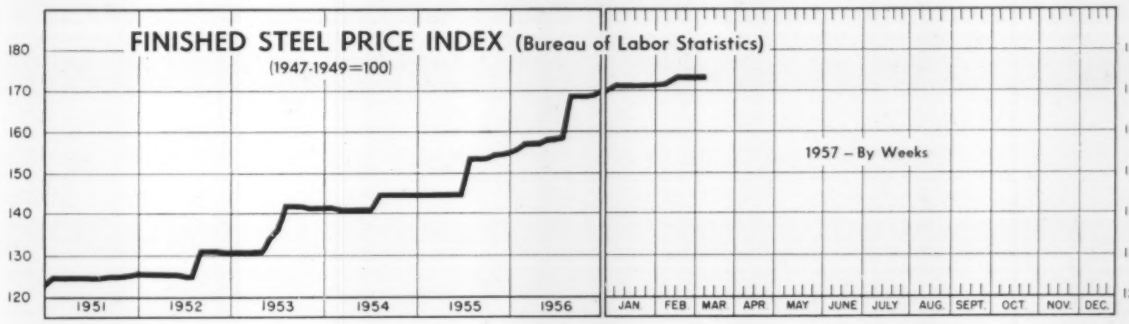
Canada . . .

Canadian production of iron and steel set records in 1956. Pig iron output totaled 3,568,196 net tons, compared with 3,213,764 in 1955. December iron production was 313,790 net tons, against 298,900 in November, and 281,935 in December, 1955.

Steel ingots and castings production for the year was 5,305,805 net tons. This compares with 4,529,401 in 1955. December output amounted to 450,138 tons, against 444,434 in November, and 423,127 in December, 1955.

Production of primary iron and steel shapes in Canada during October, last year, was 578,548 tons.

Price Indexes and Composites



Mar. 5 1957	Week Ago	Month Ago	Feb. Avg.	Year Ago
173.8	173.7	171.9	173.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 5

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.817	Bars, C.F., Carbon	9.910
Tie Plates	6.275	Bars, C.F., Alloy	13.450
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.667	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 303 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	6.075	Pipe, Galv, Buttweld (100 ft)	23.034
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.566
		Casing, Oil Well, Alloy (100 ft)	288.980
		Tubes, Boiler (100 ft)	45.670
		Tubing, Mechanical, Carbon (100 ft)	23.367
		Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
		Tin Plate, Hot-dipped, 1.25 lb	9.433
		Tin Plate, Electrolytic, 0.25 lb	8.133
		Black Plate, Canmaking Quality	7.233
		Wire, Drawn, Carbon	9.775
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.213
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Mar. 6 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	227.41	227.10	225.92	209.10	171.92
Index in cents per lb	6.161	6.152	6.111	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$139.51†	$139.51†	$138.60	$128.02	$106.32
No. 2 Fdry Pig Iron, GT	63.70	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	63.24	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	64.49	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	51.67	52.50	55.17	48.50	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Mar. 6 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.365	5.365	5.365	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, 5/32-5/8" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton

	Mar. 6 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$64.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	64.50	62.50	62.50	58.50	52.00
Basic, deld., Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, NevilleIsland,Pa.	65.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	64.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld., Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	64.00	63.00	63.00	59.00	52.50
Malleable, Chicago	64.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	205.00†	188.00*

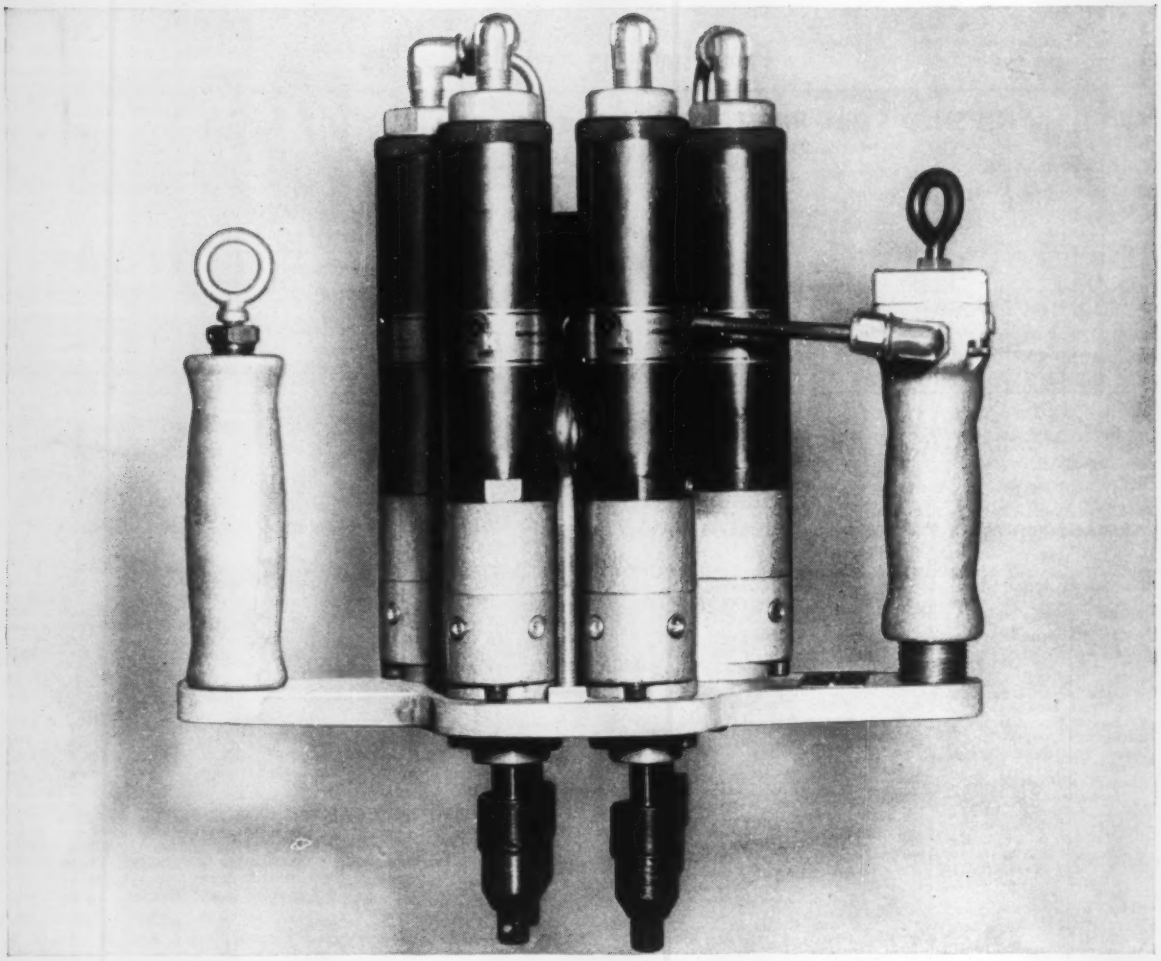
†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$51.50	$53.50	$54.50	$48.50	$44.00
No. 1 Heavy Melt, E. Pa.	56.00	56.50	59.00	50.00	42.50
No. 1 Heavy Melt, Chicago	47.50	47.50	53.50	47.00	42.50
No. 1 Heavy Melt, Valley	48.50	52.50	53.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	45.50	50.50	51.50	49.50	43.00
No. 1 Heavy Melt, Buffalo	50.50	53.50	53.50	46.50	43.00
Rails, Rerolling, Chicago	61.00	63.50	71.00	65.50	52.50
No. 1 Cast, Chicago	45.50	45.50	46.50	46.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$15.25	$15.25	$15.00	$14.125	$14.75
Beehive, Fdry, Connlsvl.	18.00	18.00	18.00	16.50	17.50



4 to 1 you'll increase output with KELLER "spindle gang"

With a flick of his thumb, the man with the *new* Keller multiple-spindle tool drives four screws at the same time. As a result, his output increased while production costs decreased.

The new medium low-torque (2 to 24 foot-pounds) Keller tool is *made to order from your assembly blueprints*, with any number of spindles. Yet tool cost is relatively low. Only the mounting plate is specially shaped and drilled. Motors and other stock components are standard designs adapted to job requirements.

Convertibility, flexibility of design, uniform torque control, low maintenance and low operator fatigue are winning a place on assembly lines for the entire line of Keller multiple-spindle nut setters and screw drivers, which range in torque delivered from 2 to 190 ft. lb.

Confer with a Gardner-Denver man about increasing your assembly production with Keller multiple-spindle tools. Or write for complete information.

Keller "K-MATIC"* drilling unit is *new*, too!

Combines advantages of mechanized feed drilling machine and portable hand drill. Designed for drilling clean, true holes in hard metals—like titanium, stainless steel, etc. Made to handle drills ⅜" or smaller. Send for free descriptive folder.

*Trade-Mark

GARDNER-DENVER

KELLER TOOL division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Steel Prices

Mill prices as reported to STEEL, Mar. 6, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following Mill points indicate producing company. Key to producers, page 240; to footnotes, page 242.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $74.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 74.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 ..... $74.00
Bridgeport,Conn. N19 .. 79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 ..... 74.00
Fontana,Calif. K1 ..... 83.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 ..... 74.00
Lackawanna,N.Y. B2 .. 74.00
LoneStar,Tex. L6 ..... 80.00
Munhall,Pa. U5 ..... 74.00
S.Chicago,Ill. R2, U5 .. 74.00
S.Duquesne,Pa. U5 .... 74.00
Sterling,Ill. N15 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ..... $91.50
Bridgeport,Conn. N19 .. 96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 .. 96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 ..... 101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston S5 ..... 96.50
Johnstown,Pa. B2 ..... 91.50
Lackawanna,N.Y. B2 .. 91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 91.50
Munhall,Pa. U5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 .... 91.50
S.SanFrancisco B3 ... 101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ... $107.00
Bridgeport,Conn. N19 .. 107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 .. 114.00
Detroit R7 ..... 107.00
Fontana,Calif. K1 .... 128.00
Gary,Ind. U5 ..... 107.00
Houston S5 ..... 112.00
Ind.Harbor,Ind. Y1 .. 107.00
Johnstown,Pa. B2 .... 107.00
Lackawanna,N.Y. B2.. 107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 ..... 107.00
Midland,Pa. C18 ..... 107.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 .. 107.00
S.Duquesne,Pa. U5 .... 107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland,O. R2 ..... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 .. 111.50
S.Duquesne,Pa. U5 ... 111.50

SKELP

Aliquippa,Pa. J5 ..... 4.725
LoneStar,Tex. L6 ..... 5.025
Munhall,Pa. U5 ..... 4.625
Warren,O. R2 ..... 4.625
Youngstown R2, U5 ... 4.625

WIRE RODS

AlabamaCity,Ala. R2 ... 5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.80
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Houston S5 ..... 6.05
IndianaHarbor,Ind. Y1.. 5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. S5 ..... 6.05
Kokomo,Ind. C16 ..... 5.90
LosAngeles B3 ..... 6.60
Minnequa,Colo. C10 .... 6.05
Monessen,Pa. P17 ..... 5.80
N.Tonawanda,N.Y. B11 .. 5.80
Pittsburg,Calif. C11 .... 6.60
Portsmouth,O. P12 ..... 5.80
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 .. 5.90
Sterling,Ill.(1) N15 .... 5.80
Sterling,Ill. N15 ..... 5.90
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 .... 6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.25
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala. T2 ..... 5.00
Fontana,Calif. K1 ..... 5.75
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston S5 ..... 5.10
Ind.Harbor Ind. I-2 .... 5.00
Johnstown,Pa. B2 ..... 5.05
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.10
Lackawanna,N.Y. B2 .... 5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 .... 5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 .... 5.85
Portland,Oreg. O4 ..... 5.80
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14.. 5.00
S.SanFrancisco B3 ..... 5.65
Sterling,Ill. N15 ..... 5.00
Torrance,Calif. C11 .... 5.70
Weirton,W.Va. W6 ..... 5.00

Wide Flange

Bethlehem,Pa. B2 ..... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 ..... 5.90
IndianaHarbor,Ind. I-2.. 5.25
Lackawanna,N.Y. B2 .... 5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 .... 5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clairton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 ..... 8.10
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston S5 ..... 7.45
Ind.Harbor,Ind. I-2, Y1.. 7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 ..... 7.45
Lackawanna,N.Y. B2 .... 7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14.. 7.35
S.SanFrancisco B3 ..... 8.00
Struthers,O. Y1 ..... 7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Lackawanna,N.Y. B2 .... 7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 5.05
Lackawanna,N.Y. B2 .... 5.05
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ... 5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago,Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky.(15) A10 ... 4.85
Bessemer,Ala. T2 ..... 4.85
Clairton,Pa. U5 ..... 4.85
Claymont,Del. C22 ..... 5.70
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 ..... 5.25
Conshohocken,Pa. A3 ... 4.95
Detroit M1 ..... 4.95
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 .. 5.60
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 ..... 5.05
Harrisburg,Pa. P4 ..... 5.80
Houston S5 ..... 4.95
Ind.Harbor,Ind. I-2, Y1.. 4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 .... 4.85
LoneStar,Tex. L6 ..... 5.20
Minnequa,Colo. C10 .... 5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. A2 ..... 4.85
Pittsburgh J5 ..... 4.85
Riverdale,Ill. A1 ..... 4.85
Seattle B3 ..... 5.75
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14.. 4.85
SparrowsPoint,Md. B2 .. 4.85
Steubenville,O. W10 .... 4.85
Warren,O. R2 ..... 4.85
Youngstown R2, U5, Y1.. 4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ..... 6.20
Fontana,Calif. K1 ..... 6.75
Geneva,Utah C11 ..... 6.00
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont,Del. C22 ..... 7.55
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 ..... 7.55
Conshohocken,Pa. A3 .. 7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1 .. 8.00
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston S5 ..... 7.35
Ind.Harbor,Ind. I-2, Y1.. 7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14.. 7.25
SparrowsPoint,Md. B2 .. 7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 .... 7.25

PLATES, Alloy

Aliquippa,Pa. J5 ..... 6.85
Claymont,Del. C22 ..... 6.85
Coatesville,Pa. L7 ..... 6.85
Fontana,Calif.(30) K1 .. 7.60
Gary,Ind. U5 ..... 6.85
Houston S5 ..... 6.95
Ind.Harbor,Ind. Y1 .... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. A2 ..... 6.85
Pittsburgh J5 ..... 6.85
Seattle B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14.. 6.85
SparrowsPoint,Md. B2 .. 6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 .. 5.925
Harrisburg,Pa. P4 ..... 6.275
Ind.Harbor,Ind. I-2 .... 5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 ..... 5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10 .. 5.10
Ashland l.c.l. (15) A10.. 5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ... 5.075
Aliquippa,Pa.(9) J5 .... 5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.575
Bessemer,Ala.(9) T2 .. 5.075
Birmingham(9) C15 .... 5.325
Bridgeport,Conn. N19 .. 5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa.(9) U5 .... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 .... 5.175
Emeryville,Calif. J7 .... 5.85
Fairfield,Ala.(9) T2 .. 5.075
Fairless,Pa.(9) U5 .... 5.225
Fontana,Calif.(9) K1 .. 5.775
Gary,Ind.(9) U5 ..... 5.075
Geneva,Utah(9) C11 .... 5.175
Houston(9) S5 ..... 5.325
Ind.Harbor(9) I-2, Y1.. 5.075
Johnstown,Pa.(9) B2 .. 5.075
Joliet,Ill. P22 ..... 5.575
KansasCity,Mo.(9) S5.. 5.325
Lackawanna(9) B2 .... 5.075
LosAngeles(9) B3 ..... 5.775
Milton,Pa. M18 ..... 5.225
Minnequa,Colo. C10 .... 5.525
Niles,Calif. P1 ..... 5.85
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11.. 5.775
Pittsburgh(9) J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
Seattle B3, N14 ..... 5.825
S.Ch'e'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5.. 5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 .... 5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Torrance,Calif.(9) C11.. 5.775
Youngstown(9) R2, U5.. 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.125
Bethlehem,Pa. B2 ..... 6.125
Bridgeport,Conn. N19 ... 6.20
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 6.125
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 ..... 7.175
Gary,Ind. U5 ..... 6.125
Houston S5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1.. 6.125
Johnstown,Pa. B2 ..... 6.125
KansasCity,Mo. S5 .... 6.375
Lackawanna,N.Y. B2 .. 6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 6.125
Pittsburgh J5 ..... 6.125
S.Chicago R2,U5,W14 .. 6.125
S.Duquesne,Pa. U5 .... 6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.425
Bessemer,Ala. T2 ..... 7.425
Bethlehem,Pa. B2 ..... 7.425
Bridgeport,Conn. N19 .. 7.50
Clairton,Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 ..... 7.425
Fontana Calif. K1 ..... 8.125
Gary,Ind. U5 ..... 7.425
Houston S5 ..... 7.675
Ind Harbor,Ind. Y1 .... 7.425
Johnstown,Pa. B2 ..... 7.425
KansasCity,Mo. S5 .... 7.675
Lackawanna,N.Y. B2 .. 7.425
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Seattle B3 ..... 8.175
S.Chicago,Ill. U5, W14.. 7.425
S.Duquesne,Pa. U5 .... 7.425
S.SanFrancisco B3 .... 8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2.. 5.225
Houston(9) S5 ..... 5.325
KansasCity,Mo.(9) S5.. 5.325
Lackawanna(9) B2 .... 5.075
Sterling,Ill. N15 ..... 5.175
Sterling,Ill.(1) N15 .... 5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.075
Atlanta A11 ..... 5.575
Joliet,Ill. P22 ..... 5.575
Niles,Calif. P1 ..... 5.85
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.45
KansasCity,Mo. S5 ..... 6.45
Pittsburgh J5 ..... 6.20
Youngstown U5 ..... 6.20

BARS, C.F. Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 .... 9.475
BeaverFalls,Pa. M12 .. 9.475
Chicago W18 ..... 9.475
Cleveland C20 ..... 9.475
LosAngeles S30 ..... 11.10
LosAngeles P2 ..... 11.35
Monaca,Pa. S17 ..... 9.475
Newark,N.J. W18 ..... 9.65
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 6.85
BeaverFalls,Pa. M12, R2.. 6.85
Birmingham C15 ..... 7.45
Bridgeport,Conn. N19 ... 7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.85
Chicago W18 ..... 6.85
Cleveland A7, C20 ..... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.85
Donora,Pa. A7 ..... 6.85
Elyria,O. W8 ..... 6.85
FranklinPark,Ill. N5 ... 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 ..... 6.85
Hammond,Ind. L2, M13.. 6.85
Hartford,Conn. R2 ..... 7.35
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) S30 .... 8.30
LosAngeles R2 ..... 8.75
LosAngeles P2 ..... 8.30
Mansfield,Mass. B5 .... 7.40
Massillon,O. R2, R8 .... 6.85
Midland,Pa. C18 ..... 6.85
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 .. 6.85
Pittsburgh J5 ..... 6.85
Plymouth,Mich. P5 ..... 7.10
Putnam,Conn. W18 ..... 7.40
Readville,Mass. C14 ..... 7.40
S.Chicago,Ill. W14 .... 6.85
SpringCity,Pa. K3 ..... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F3, Y1 .... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.. 6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 ..... 8.325
Bridgeport,Conn. N19 .. 8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 8.325
Carnegie,Pa. C12 ..... 8.325
Chicago W18 ..... 8.325
Cleveland A7, C20 .... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 8.325
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 8.325
FranklinPark,Ill. N5 .. 8.325
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 ..... 8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 .... 8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 .. 8.325
LosAngeles S30 ..... 10.10
LosAngeles P2 ..... 10.20
Mansfield,Mass. B5 .. 8.625
Massillon,O. R2, R8 .. 8.325
Midland,Pa. C18 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
Plymouth,Mich. P5 .... 8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 ..... 8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 .... 8.625
Youngstown F3, Y1 .... 8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.575
Birmingham C15 ..... 5.325
Bridgeport,Conn. N19 .. 5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich. G5 ..... 5.425
Emeryville,Calif. J7 .... 5.85

Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 .....5.225
Ft. Worth,Tex.(42) T4..5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....6.10
ChicagoHts.(4) C2 ....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ....6.10
JerseyShore,Pa.(4) J8 ..5.50
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19..5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14. 16.80
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 ....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 ....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ...6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshonocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Irvin,Pa. U5 .....8.575
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	..6.65	7.15
Fairfield T2	....6.65	6.90
Gary,Ind. U5	....6.65	6.90
GraniteCity,Ill.G4	6.85	...
Ind.Harbor I-2	..6.65	6.90
Irvin,Pa. U5	....6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	....6.65	...
Pitts.,Calif. C11	..7.40	...
SparrowsPt. B2	..6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 ....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ..7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merr'tt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.675
Allenport,Pa. P7 .....4.675
Alton,Ill. L1 .....4.875
Ashland,Ky.(8) A10 ...4.675
Atlanta A11 .....4.675
Bessemer,Ala. T2 .....4.675
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Houston S5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.675
Johnstown,Pa.(25) B2..4.675
KansasCity,Mo. S5 ....4.925
Lackaw'na,N.Y.(25) B2 4.675
LosAngeles(25) B3 ....5.425
Minnequa,Colo. C10 ...5.775
Pittsburg,Calif. C11 ...5.425
Riverdale,Ill. A1 .....4.675
SanFrancisco S7 .....5.95
Seattle(25) B3 .....5.675
Seattle N14 .....5.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
S.SanFrancisco(25) B3.5.425
SparrowsPoint,Md. B2..4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Torrance,Calif. C11 ...5.425
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5 .....4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
LosAngeles B3 .....8.95
Newport,Ky. A2 .....7.75
Sharon,Pa. S3 .....7.75
S.Chicago,Ill. W14 ....7.75
Youngstown U5, Y1 ....7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....6.95
Conshohocken,Pa. A3 ...6.95
Ecorse,Mich. G5 .....7.05
Fairfield,Ala. T2 .....6.95
Gary,Ind. U5 .....6.95
Houston S5 .....7.20
Ind.Harbor,Ind. I-2, Y1..6.95
KansasCity,Mo. S5 ....7.20
Lackawanna,N.Y. B2 ..6.95
LosAngeles(25) B3 ....7.70
Seattle(25) B3 .....7.95
Sharon,Pa. S3 .....6.95
S.SanFrancisco(25) B3 ..7.70
SparrowsPoint,Md. B2...6.95
Warren,O. R2 .....6.95
Weirton,W.Va. W6 .....6.95
Youngstown U5, Y1 ....6.95

STRIP, Hot-Rolled Ingot Iron

Ashland Ky.(8) A10 ...4.925
Warren,O. R2 .....5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.85
Baltimore T6 .....6.85
Boston T6 .....7.40
Buffalo S40 .....6.85
Cleveland A7, J5 .....6.85
Conshohocken,Pa. A3 ...6.90
Dearborn,Mich. D3 .....6.95
Detroit D2, M1, P20....6.95
Dover,O. G6 .....6.85
Ecorse,Mich. G5 .....6.95
Follansbee,W.Va. F4 ...6.85
Fontana,Calif. K1 .....8.70
FranklinPark,Ill. T6 ...6.95
Ind.Harbor,Ind. Y1 ....6.85
Indianapolis C8 .....7.00
LosAngeles C1 .....8.90
NewBedford,Mass. R10..7.30
NewBritain(10) S15 ....6.85
NewCastle,Pa. B4, E5 ..6.85
NewHaven Conn. D2 ...7.30
NewKensington,Pa. A6..6.85
Pawtucket,R.I. R3 .....7.50
Pawtucket,R.I. N8 .....7.40
Pittsburgh J5 .....6.85
Riverdale,Ill. A1 .....6.95
Rome,N.Y.(32) R6 .....6.85
Sharon,Pa. S3 .....6.85
Trenton,N.J.(31) R5 ....8.30
Wallingford,Conn. W2 ..7.30
Warren,O. R2, T5 .....6.85
Weirton,W.Va. W6 .....6.85
Worcester,Mass. A7 .....7.40
Youngstown C8, Y1 ....6.85

STRIP, Cold-Rolled Alloy

Boston T6 .....14.90
Carnegie,Pa. S18 .....14.55
Cleveland A7 .....14.55
Dover,O. G6 .....14.55
FranklinPark,Ill. T6 ..14.55
Harrison,N.J. C18 .....14.55
Indianapolis C8 .....14.70
Pawtucket,R.I. N8 ....14.90
Sharon,Pa. S3 .....14.55
Worcester,Mass. A7 ...14.85
Youngstown C8 .....14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.00
Dearborn,Mich. D3 ....10.10
Dover,O. G6 .....10.10
Ecorse,Mich. G5 .....10.10
Ind.Harbor,Ind. Y1 ....10.20
Sharon,Pa. S3 .....10.00
Warren,O. R2 .....10.00
Weirton,W.Va. W6 ....10.00
Youngstown Y1 .....10.20

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.60

STRIP, C.R. Electrogalvanized

Cleveland A7 .....6.85*
Dover,O. G6 .....6.85*
Riverdale,Ill. A1 .....6.95*
Warren,O. B9, T5 ....6.85*
Worcester,Mass. A7 ...7.40*
Youngstown C8 .....6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.975

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.40
Riverdale,Ill. A1 .....5.25
Sharon,Pa. S3 .....5.10
Youngstown U5 .....5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	...	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	9.80	12.00	15.00	17.95
Dover,O. G6	*8.65*	*10.10*	*12.30*	*15.30*	*18.25*
Detroit D2	8.75	10.20	12.40	15.40	....
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	....	....	*12.60*	*15.60*	*18.55*
Indianapolis C8	*8.80*	*10.25*	*12.30*	*15.30*	*18.25*
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15	*8.65*	*10.10*	*12.30*	*15.30*	*18.25*
NewCastle,Pa. B4, E5	7.95	9.80	12.00	15.00	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	*8.65*	*10.10*	*12.30*	*15.30*	....
New York W3	....	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome,N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	*8.65*	*10.10*	*12.30*	*15.30*	*18.25*
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	*8.65*	*10.10*	*12.30*	*15.30*	*18.25*

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	17.10	20.95	25.30
Buffalo W12	...	...	16.80	....	....
FranklinPark,Ill. T6	...	...	17.15	21.00	25.35
Harrison,N.J. C18	...	...	*17.10*	*20.95*	*25.30*
NewYork W3	...	...	17.10	20.95	25.30
Palmer,Mass. W12	...	...	16.80	....	....
Trenton,N.J. R5	...	...	17.10	20.95	25.30
Worcester,Mass. A7, T6	...	...	*17.10*	*20.95*	*25.30*
Youngstown C8	...	...	*17.45*	*21.30*	*25.65*

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10..	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed 1½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2...	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5 ..	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5..	$9.70	$9.95
Fairfield,Ala. T2 .	9.80	10.05
Fairless,Pa. U5 ..	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11..	10.45	10.70
Sp.Pt.,Md. B2 ...	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10.	9.70	9.95

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$7.50
Fairfield,Ala. T2 .....7.60
Fairless,Pa. U5 .....7.60
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 .....7.60
Ind.Harbor,Ind. I-2, Y1..7.50
Irvin,Pa. U5 .....7.50
Niles,O. R2 .....7.50
Pittsburg,Calif. C11 ....8.25
SparrowsPoint,Md. B2 ..7.60
Weirton,W.Va. W6 .....7.50
Yorkville,O. W10 .....7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.15
Gary,Ind. U5 .....7.15
GraniteCity,Ill. G4 .....7.25
Ind.Harbor,Ind. Y1 ....7.15
Irvin,Pa. U5 .....7.15
Yorkville,O. W10 .....7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5 .....$9.20
Irvin,Pa. U5 .....9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5 .....$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...7.20
Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.40
Atlanta A11 .....7.40
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Chicago W13 .....7.20
Cleveland A7, C20 .....7.20
Crawfordsville,Ind. M8..7.30
Donora,Pa. A7 .....7.20
Duluth A7 .....7.20
Fairfield,Ala. T2 .....7.20
Fostoria,O.(24) S1 .....7.30
Houston S5 .....7.45
Jacksonville,Fla. M8 ...7.55
Johnstown,Pa. B2 .....7.20
Joliet,Ill. A7 .....7.20
KansasCity,Mo. S5 .....7.45
Kokomo,Ind. C16 .....7.30
LosAngeles B3 .....8.15
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16...7.20
N.Tonawanda,N.Y. B11..7.20
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ....8.15
Portsmouth,O. P12 .....7.20
Rankin,Pa. A7 .....7.20
S.Chicago,Ill. R2 .....7.20
S.SanFrancisco C10 ....8.15
SparrowsPoint,Md. B2 ..7.30
Sterling,Ill.(1) N15 .....7.20
Sterling,Ill. N15 .....7.30
Struthers,O. Y1 .....7.20
Waukegan,Ill. A7 .....7.20
Worcester,Mass. A7 ....7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 .....11.75
Buffalo W12 .....11.75
Cleveland A7 .....11.90
Donora,Pa. A7 .....11.90
Duluth A7 .....11.90
Johnstown,Pa. B2 .....11.90
Minnequa,Colo. C10 ..11.875
Monessen,Pa. P16 .....*11.90*
Muncie,Ind. I-7 .....11.95
NewHaven,Conn. A7 ..12.20
Palmer,Mass. W12 ....12.05
Pittsburg,Calif. C11 ...12.55
Portsmouth,O. P12 ....11.90
Roebling,N.J. R5 .....12.20
SparrowsPt.,Md. B2 ...12.00
Struthers,O. Y1 .....11.75
Trenton,N.J. A7 .....12.20
Waukegan,Ill. A7 .....11.90
Worcester,Mass. A7 ...12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....8.70
Alton,Ill. L1 .....8.60
Buffalo W12 .....8.40
Cleveland A7 .....8.70
Donora,Pa. A7 .....8.70
Duluth A7 .....8.70
Johnstown,Pa. B2 .....8.70
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.65
Minnequa,Colo. C10 ....8.60
Monessen,Pa. P7, P16....8.70
NewHaven,Conn. A7 ...9.00
Palmer,Mass. W12 .....8.70
Pittsburg,Calif. C11 ....9.35
Portsmouth,O. P12 .....8.70
Roebling,N.J. R5 .....8.70
S.Chicago,Ill. R2 .....8.70
S.SanFrancisco C10 ....9.35
SparrowsPt.,Md. B2 ....8.80
Struthers,O. Y1 .....8.40
Trenton,N.J. A7 .....9.00
Waukegan,Ill. A7 .....8.70
Worcester,Mass. A7 ....9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.025
Alton,Ill. L1 .....8.925
Bartonville,Ill. K4 .....8.825
Buffalo W12 .....8.725
Cleveland A7 .....9.025
Donora,Pa. A7 .....9.025
Duluth A7 .....9.025
Fostoria,O. S1 .....8.775
Johnstown,Pa. B2 .....9.025
LosAngeles B3 .....9.975
Milbury,Mass.(12) N6..9.325
Minnequa,Colo. C10 ...8.975
Monessen,Pa. P7, P16...9.025
Muncie,Ind. I-7 .....8.925
Palmer,Mass. W12 ....9.025
Pittsburg,Calif. C11 ....9.675
Portsmouth,O. P12 ....9.025
Roebling,N.J. R5 .....9.025
S.Chicago,Ill. R2 .....9.025
S.SanFrancisco C10 ...9.675
SparrowsPt.,Md. B2 ....9.125
Struthers,O. Y1 .....8.725
Trenton,N.J. A7 .....9.325
Waukegan,Ill. A7 .....9.025
Worcester J4, T6, W12..9.025
Worcester,Mass. A7 ...9.325

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....14.35
Bartonville,Ill. K4 ....14.25
Buffalo W12 .....14.15
Chicago W13 .....14.15
Cleveland A7 .....14.15
Crawfordsville,Ind. M8.14.25
Fostoria,O. S1 .....14.15
Jacksonville,Fla. M8 ..14.50
Johnstown,Pa. B2 .....14.15
Kokomo,Ind. C16 .....14.15
Minnequa,Colo. C10 ...13.90
Monessen,Pa. P6 .....14.15
Muncie,Ind. I-7 .....14.35
Palmer,Mass. W12 ....14.45
Roebling,N.J. C10 ....14.45
S.SanFrancisco C10 ....14.50
Waukegan,Ill. A7 .....14.15
Worcester,Mass. A7, T6 14.45

ROPE WIRE (A)

Bartonville,Ill. K4 ....11.55
Buffalo W12 .....11.55
Fostoria,O. S1 .....11.55
Johnstown,Pa. B2 .....11.55
Monessen,Pa. P7 .....11.55
Muncie,Ind. I-7 .....11.75
Palmer,Mass. W12 ....11.85
Portsmouth,O. P12 ....12.00
Roebling,N.J. R5 .....11.85
SparrowsPt.,Md. B2 ...11.65
Struthers,O. Y1 .....11.55
Worcester,Mass. J4 ....11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	15.45
Roebling,N.J. R5	15.60

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	.164
Aliquippa,Pa. J5	.164
Atlanta A11	.166
Bartonville,Ill. K4	.166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	.164
Duluth A7	.164
Fairfield,Ala. T2	.164
Houston,Tex. S5	.169
Jack'ville,Fla. (20) M8	.175
Johnstown,Pa. B2	.164
Joliet,Ill. A7	.164
KansasCity,Mo. S5	.169
Kokomo,Ind. C16	.166
Minnequa,Colo. C10	.169
Monessen,Pa. P7	.164
Pittsburg,Calif. C11	.183
Rankin,Pa. A7	.164
S.Chicago,Ill. R2	.164
SparrowsPt.,Md. B2	.166
Sterling,Ill. (7) N15	.166
Worcester,Mass. A7	.170

NAILS, Stock

	Col.
Chicago W13	.164
Cleveland A9	.170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	9.63
Buffalo W12	10.05
Chicago W13	9.53
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.53
Duluth A7	9.53
Fairfield,Ala. T2	9.53
Houston S5	9.78
Jack'ville,Fla. M8	10.09
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
KansasCity,Mo. S5	9.78
Kokomo,Ind. C16	9.63
LosAngeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.63
Sterling,Ill.(37) N15	9.63

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	10.35
Chicago W13	9.85
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	9.85
Duluth A7	9.85
Fairfield,Ala. T2	9.85
Houston S5	10.10
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
KansasCity,Mo. S5	10.10
Kokomo,Ind. C16	9.95
LosAngeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.65
SparrowsPt.,Md. B2	9.95
Sterling,Ill.(37) N15	9.95

Coil Interim	
AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	10.40
Chicago W13	9.90
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	9.90
Duluth A7	9.90
Fairfield,Ala. T2	9.91
Houston S5	10.15
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
KansasCity,Mo. S5	10.15
Kokomo,Ind. C16	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	10.00
Sterling,Ill.(37) N15	10.00

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.184**
Aliquippa,Pa. J5	.181§
Atlanta A11	.190*
Bartonville,Ill. K4	.190
Crawfordsville,Ind. M8	.190
Donora,Pa. A7	.184†
Duluth A7	.184†
Fairfield,Ala. T2	.184†
Houston,Tex. S5	.189**
Jacksonville,Fla. M8	.195
Johnstown,Pa. B2	.188*
Joliet,Ill. A7	.184†
KansasCity,Mo. S5	.189**
Kokomo,Ind. C16	.186†
Minnequa,Colo. C10	.189**
Monessen,Pa. P7	.188*
Pittsburg,Calif. C11	.204†
Rankin,Pa. A7	.184†
S.Chicago,Ill. R2	.184**
S.SanFrancisco C10	.204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	.190*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.176**
Aliq'ppa,Pa. 9-14½ga.J5	179§
Atlanta A11	.182*
Bartonville,Ill. K4	.182
Crawfordsville,Ind. M8	.182
Donora,Pa. A7	.176†
Duluth A7	.176†
Fairfield,Ala. T2	.176†
Houston,Tex. S5	.181**
Jacksonville,Fla. M8	.187
Johnstown,Pa.(43) B2	.180*
Joliet,Ill. A7	.176†
KansasCity,Mo. S5	.181**
Kokomo,Ind. C16	.178†
Minnequa,Colo. C10	.181**
Monessen,Pa. 9 ga. P7	.180*
Pittsburg,Calif. C11	.199†
Rankin,Pa. A7	.176†
S.Chicago,Ill. R2	.176**
Sterling,Ill.(7) N15	.182*

	An'ld	Galv.
WIRE (16 gage)	**Stone**	**Stone**
Ala.City,Ala.R2	15.70	17.25**
Aliq'ppa,Pa. J5	15.70	17.50
Bartonville K4	15.80	17.75
Buffalo W12	16.10	....
Cleveland A7	15.70	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	16.20	17.75†
Houston S5	15.95	17.50**
Jacksonville M8	16.05	18.00
Johnstown B2	15.70	17.65*
Kan.City,Mo. S5	15.95	....
Kokomo C16	15.80	17.35†
Minnequa C10	16.05	17.75**
P'lm'r,Mass.W2	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	15.80	17.75*
Sterling(37) N15	15.80	17.75*
Waukegan A7	15.70	17.25†
Worcester A7	16.00	....

WIRE, Merchant Quality (6 to 8 gage)	**An'ld**	**Galv.**
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	7.95	8.475§
Atlanta (48) A11	8.05	8.65*
Bartonville(48) K4	8.05	8.65
Buffalo W12	8.10	8.50†
Cleveland A7	7.95	....
Crawfordsville M8	8.05	8.65
Donora,Pa. A7	7.95	8.35†
Duluth A7	7.95	8.35†
Fairfield T2	7.95	8.35†
Houston(48) S5	8.20	8.60**
Jacks'ville,Fla. M8	8.30	8.90
Johnstown B2(48)	7.95	8.55*
Joliet,Ill. A7	7.95	8.35†
Kans.City(48) S5	8.20	8.60**
Kokomo C16	8.05	8.45†
LosAngeles B3	8.90	9.50*
Minnequa C10	8.20	8.60**
Monessen P7 (48)	7.95	8.55*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	8.90	9.30†
Rankin,Pa. A7	7.95	8.35†
S.Chicago R2	7.95	8.35**
S.SanFran. C10	8.90	9.30**
Spar'wsPt. B2(48)	8.05	8.65*
Sterling(37)(48)N15	8.05	8.65*
Struth'rs,O.(48)Y1	7.95	8.45‡
Worcester,Mass.A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	.190
Atlanta A11	.192
Bartonville,Ill. K4	.192
Crawfordsville,Ind. M8	.192
Donora,Pa. A7	.190
Duluth A7	.190
Fairfield,Ala. T2	.190
Houston S5	.195
Jacksonville,Fla. M8	.197
Joliet,Ill. A7	.190
KansasCity,Mo. S5	.195
Kokomo,Ind. C16	.192
Minnequa,Colo. C10	.195
Pitts.,Calif. C11	.214
S.Chicago,Ill. R2	.190
S.SanFrancisco C10	.214
Sterling,Ill.(7) N15	.192
SparrowsPoint,Md. B2	.192
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	.167
Franklin,Pa. F5	.167
Huntington,W.Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.167
Minnequa,Colo. C10	.172
Sterling,Ill.(1) N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	55
Longer than 6 in.	46.5
⅝ in. thru 1 in.:	
6 in. and shorter	46.5
Longer than 6 in.	44
1⅛ in. and larger:	
All lengths	44

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	55

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in and smaller:	
6 in. and shorter	35
Longer than 6 in.	23
⅝ in. thru 1 in.:	
6 in. and shorter	20
Longer than 6 in.	20
1⅛ in. and larger:	
All lengths	20

Lag Bolts

All diameters:	
6 in. and shorter	55
Longer than 6 in.	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	54
Larger than ½ in. or longer than 6 in.	47
Blank Bolts	47
Step, Elevator, Tire Bolts	54

NUTS

Reg. & Heavy Square Nuts:

All sizes	59

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	45

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	63
⅞ in. to 1 in., incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger	58

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger	58

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	50
⅞ in. to 1 in., incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

¾ in. and smaller	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger	58

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

½ in. and smaller	47
¾, ⅞ and 1 in. diam.	31

Longer than 6 in.:

½ in. and smaller	18.5
¾, ⅞ and 1 in. diam.	5.5

High Carbon, Heat Treated:

6 in. and shorter:

½ in. and smaller	34
¾, ⅞ and 1 in. diam.	13

Longer than 6 in.:

½ in. and smaller	+1
¾, ⅞ and 1 in. diam.	+19

Fillister Head, Coarse Thread:

Listed Sizes	+31

Flat Head, Coarse Thread:

¼ in. and smaller by 6 in. and shorter	+57

Set Screws, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter	+11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 11.50
$\frac{7}{16}$-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	22.84
1¼	13	....	29.07	22.68
1½	13	27.45	32.14	25.08
1¾	13	32.43	37.97	29.64
2	13	36.34	42.56	33.21
2¼	13	40.93	47.94	37.42
2¼	12	44.42	52.03	40.61
2½	12	48.94	57.31	44.73
2¾	12	52.99	62.05	48.44
3	12	56.51	66.18	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	*5.275*	*5.175*	*5.225*	*6.25*
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	....
Huntington,W.Va. C15	....	....	....	6.00
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	....
Johnstown,Pa. B2	....	....	....(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	*6.275*
Gary,Ind. U5	*6.275*
Ind.Harbor,Ind. I-2	*6.275*
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	*6.275*
Seattle B3	6.175
Steelton,Pa. B2	6.275
Torrance,Calif. C11	*6.425*

JOINT BARS

Bessemer,Pa. U5	*6.60*
Fairfield,Ala. T2	*6.60*
Ind.Harbor,Ind. I-2	*6.60*
Joliet,Ill. U5	*6.60*
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	*6.60*
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	*13.85*
KansasCity,Mo. S5	13.10
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	*13.85*
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Lebanon,Pa. B2	*13.60*
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	*9.225*
Ind.Harbor,Ind. I-2, Y1	*9.225*
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	*9.225*
Pittsburgh J5	*9.225*
Seattle B3	9.275
S.Chicago,Ill. R2	*9.225*
Struthers,O. Y1	*9.225*
Youngstown R2	*9.225*

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+2.75	+20.75	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	6.5	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Younstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+3.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
*Copper**	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.480
Oil Hardening	0.450	Hi-Carbon-Cr	0.530

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1	62.50	63.00	63.50	64.00
Buffalo R2	*64.50*	*65.00*	*65.50*	*66.00*
Tonawanda,N.Y. W12	*64.50*	*65.00*	*65.50*	*66.00*
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	*64.50*	*65.00*	*65.00*	*65.50*
S.Chicago,Ill. R2	*64.50*	....	*65.00*	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. W14	*64.50*	....	*65.00*	*65.50*
Milwaukee, deld.	64.96	65.46	65.46	65.96
Muskegon,Mich., deld.	....	76.83	76.83	....
Cleveland District				
Cleveland R2, A7	*64.50*	*65.00*	*65.00*	*65.50*
Akron,O., deld.	*67.62*	*68.12*	*68.12*	*68.62*
Mid-Atlantic District				
Birdsboro,Pa. B10	*66.50*	*67.00*	*67.50*	*68.00*
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Swedeland,Pa. A3	*66.50*	*67.00*	*67.50*	*68.00*
New York, deld.	....	*73.20*	*73.70*	....
Newark,N.J., deld.	*70.52*	*71.02*	*71.52*	*72.02*
Philadelphia, deld.	*68.38*	*68.88*	*69.38*	*69.88*
Troy,N.Y. R2	*66.50*	*67.00*	*67.50*	*68.00*
Pittsburgh District				
Neville Island,Pa. P6	*64.50*	*65.00*	*65.00*	*65.50*
Pittsburgh (N&S sides), Aliquippa, deld.	....	*66.45*	*66.45*	*66.98*
McKeesRocks,Pa., deld.	....	*66.10*	*66.10*	*66.63*
Lawrenceville, Homestead, Wilmerding, Monaca,Pa. deld.	....	*66.76*	*66.76*	*67.29*
Verona, Trafford,Pa. deld.	*66.79*	*67.32*	*67.32*	*67.85*
Brackenridge,Pa. deld.	*67.10*	*67.60*	*67.60*	*68.13*
Midland,Pa. C18	*64.50*	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	*64.50*	....	*65.00*	*65.50*
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	*64.50*	*65.00*	*65.00*	*65.50*
Erie,Pa. I-3	*64.50*	*65.00*	*65.00*	*65.50*
Everett,Mass. E1	64.50	65.00	65.50	....
Fontana,Calif. K1	70.50	71.00	....	....
Geneva,Utah C11	*64.50*	*65.00*	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	*64.50*	*65.00*	....	....
Minnequa,Colo. C10	*66.50*	*67.00*	*67.50*	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	*64.50*	*65.00*	*65.00*	*65.50*
Cincinnati, deld.	*71.04*	*71.54*	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	*77.25*
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Troy,N.Y. R2 (Phos. 0.035% max)	*72.50*
Philadelphia, deld.	*80.26*
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	*69.50*
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	*69.50*
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	*69.50*
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

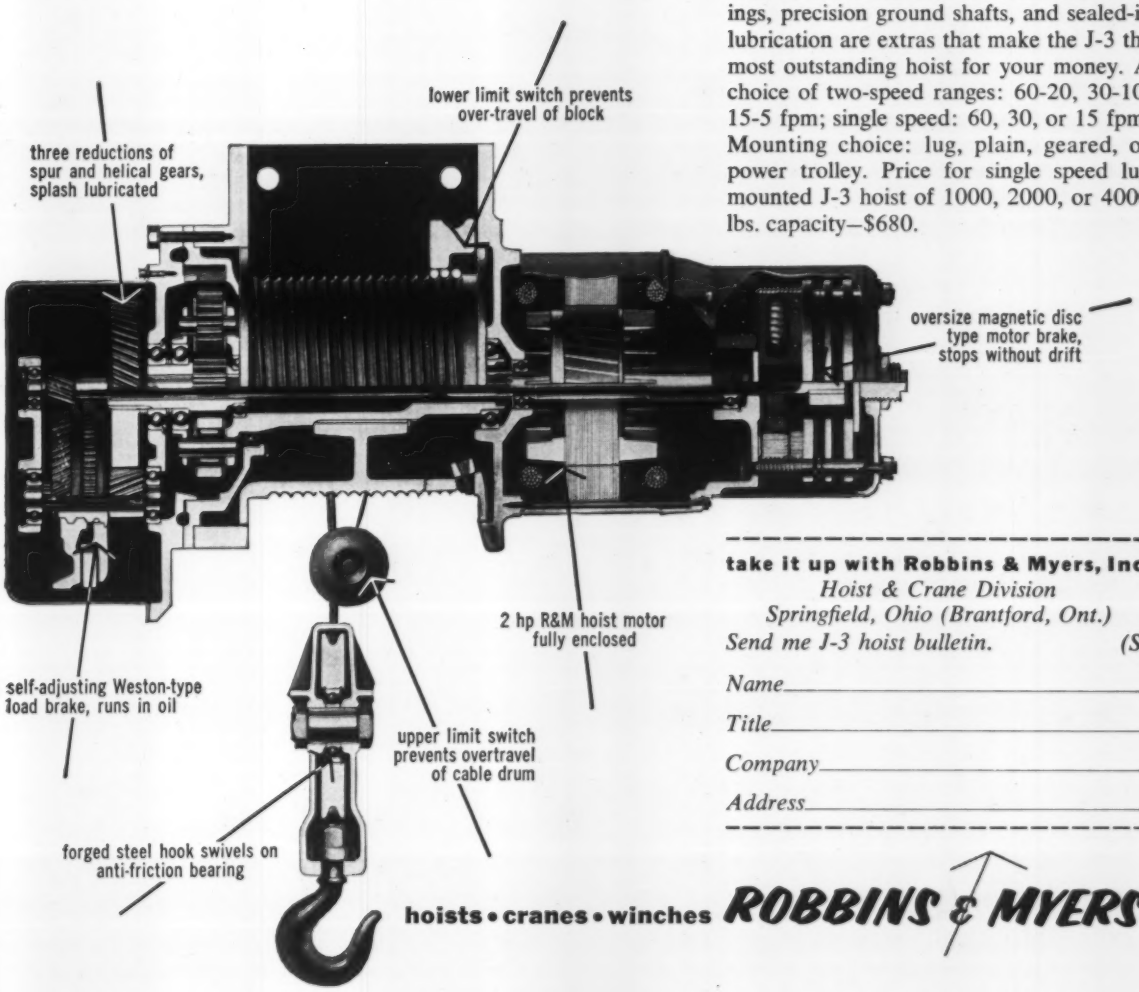
	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	9.13[5]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	....	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	10.71	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	....	....	8.44	8.40	10.26
Chicago	7.80	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.55	11.09	12.41	....	9.70	9.75	10.54	18.89	9.60	9.50	11.15
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.75	8.88	9.60[10]	....	7.90	8.00	8.70[10]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	....	....	8.54	8.50	10.34
Los Angeles	9.10	10.80	11.65	....	9.15	9.05	11.70	15.35	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	8.70	....	7.78	8.36	...
New York	8.45	9.66	10.23	60.20	8.90	9.01	10.65	14.39	8.91	9.01	10.31
Norfolk, Va.	8.05	...	...	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.71	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	8.07	8.07	8.60	14.15	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	55.20	11.05‡‡	9.45	13.55	14.60	9.35	12.20§§	11.60
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	73.36	8.43	8.28	8.96	14.41	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	9.21	....	8.94	8.90	9.87
San Francisco	8.95	10.30	10.80	53.45	8.95	9.05	12.30	15.35	9.05	9.20	11.45
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.30
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.55	13.30	16.40	9.35	9.30	11.75
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **½-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—400 to 999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

too much hoist?

R&M J-3 hoists have specific points of superiority that go beyond what hoist users usually consider "adequate." The 2 hp R&M high torque hoist motor, designed and built for full-time, full-load hoist duty, has the highest motor rating found in any standard hoist (30 min., 55 degrees C.), giving it ample reserve for accidental overloads. Power is transmitted through three reductions of cut helical and spur gears, instead of the usual two. Oversize ball bearings, precision ground shafts, and sealed-in lubrication are extras that make the J-3 the most outstanding hoist for your money. A choice of two-speed ranges: 60-20, 30-10, 15-5 fpm; single speed: 60, 30, or 15 fpm. Mounting choice: lug, plain, geared, or power trolley. Price for single speed lug mounted J-3 hoist of 1000, 2000, or 4000 lbs. capacity—$680.


lower limit switch prevents over-travel of block
three reductions of spur and helical gears, splash lubricated
oversize magnetic disc type motor brake, stops without drift
2 hp R&M hoist motor fully enclosed
self-adjusting Weston-type load brake, runs in oil
upper limit switch prevents overtravel of cable drum
forged steel hook swivels on anti-friction bearing

take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)
Send me J-3 hoist bulletin. *(S)*

*Name*_____

*Title*_____

*Company*_____

*Address*_____

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Refractories

(Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅜-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	62-64% 25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	*$24.00-26.00*
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	*$3.20-3.65*
60-65%	*3.60-3.80*

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	*3820*
Ton lots	*40.20*
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	*35.80-45.00†*
Bronze, 5000-lb lots	*44.70-59.00†*
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	*$1.065*
Nickel-Silver, 5000-lb lots	*54.70-66.40†*
Phosphor-Copper, 5000-lb lots	*64.00*
Copper (atomized) 5000-lb lots	*46.50-54.00‡*
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	*$1.08*
Stainless Steel, 316	*$1.44*
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 2000 mesh:	
1000 lb and over	4.20
Less than 1000 lb.	4.35
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	*7.50*	*7.50*	*7.50*	*7.75*
Channels	*7.70*	*7.70*	*7.70*	*7.95*
Plates (basic bessemer)	*9.00*	*9.00*	*9.00*	*9.30*
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	*6.90*	*6.90*	*6.90*	*7.35*
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.57
Oil Country Pipe: Mills withdrawn temporarily.				

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

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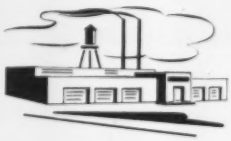

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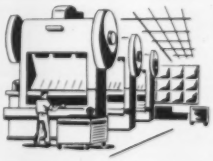

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Scrap Price Downtrend Continues

Index on steelmaking grades falls another 83 cents to $51.67 as the mills continue to buy only limited tonnages. Higher pig iron prices may stimulate interest in scrap offerings

Scrap Prices, Page 250

Washington — The Department of Commerce has resumed granting export licenses for all grades of iron and steel scrap except heavy melting. Heavy melting, the most sought grade, is said to be in shortest supply. Recently, the government delayed the issuance of licenses on exports to Japan, Great Britain, and the six-nation European Coal & Steel Community, pending a "fresh" look into the export situation. At the time, it was thought restrictions would be tightened only with respect to quality, not quantity.

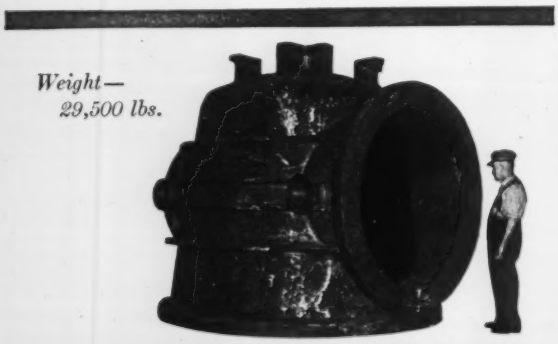
Philadelphia—Independent mills are buying prime open-hearth grades of scrap at $56, delivered, the price previously paid by U.S. Steel's Fairless Works (incorrectly reported last week as $57). Current purchases are limited. There are some indications of inventory reductions at consumers' plants, with spring near and a freer movement of yard scrap in prospect. But yard accumulations are small.

Prime grades are steady at $56, delivered, with No. 2 heavy melting steel at $47.50 and No. 2 bundles at $46. Heavy turnings have been reduced to $52, delivered, and low phos structurals and plates to $61-$62. Cast iron scrap prices are unchanged, with higher prices on pig iron imparting strength.

New York—Domestic scrap shipments are fairly well sustained, but the export movement from this port has been reduced to a trickle by the continuation of the tugboat strike. This had an unsettling effect on the entire market, with prices easier on several grades. Brokers have reduced buying prices on the prime open-hearth grades to $50-$51; on No. 2 heavy melting to $41-$42; and on No. 2 bundles to $37-$38. They have also dropped prices on machine shop turnings to $31-$32; mixed borings and turnings to $32-$34; and unstripped motor blocks to $35-$36.

Boston — No. 1 heavy melting steel and bundles are off $1.50 a ton, with borings and turnings also inclined to ease. For shipment to district consumers, the best price brokers are paying for heavy melting is $46.50, shipping point. This compares with $51.50 in January. Buying is light for March, with the bulk of activity centered in covering for eastern Pennsylvania mills.

Chicago — Open-hearth scrap prices have held during the past week, but blast furnace grades have sold $1 to $2 a ton lower, and railroad items are easier by



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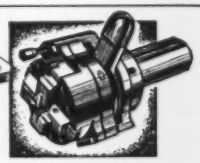

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$1 or $2 a ton. The market is only moderately active, and there is no indication of which direction prices will go in upcoming acquisitions.

The fact that 42 of the district's 43 blast furnaces are operating to provide a generous supply of hot metal lessens the pressure on scrap.

Pittsburgh—A major mill here purchased No. 1 heavy melting for $52 a ton, No. 2 heavy melting for $45 and No. 2 bundles for $43, continuing the downward trend in prices. No. 1 heavy melting is off $2, while the other prices are down $3. A mixed situation prevailed in turnings, but by the end of last week, prices had declined $3 a ton.

Scrap collections lag. Prices on some steel products and pig iron were raised last week, causing some market observers to think the softness in scrap may be soon ended.

Cleveland — Quiet continues in the local scrap market. The mills are showing little interest in dealers' offerings even though dealer stocks are not large. Better weather is expected to increase the flow of material to the yards. Published prices are largely nominal.

Youngstown — The local scrap market continues to mark time, with some observers anticipating further prices declines. Last orders placed here were at $54 for No. 1 heavy melting, $53 for No. 1 bundles, $50 for No. 2 heavy melting and $45 for No. 2 bundles.

Detroit—Steel scrap prices are holding unchanged, but dealers look for some firming. The first slideoff in foundry grades of scrap is being experienced. Active foundry operations in the automotive industry have helped keep the cast grades firm. Brokers think current easiness is temporary.

Cincinnati — Key scrap grades tumbled $2.50 a ton last week as a local mill entered the market in a bearish mood. The purchase wasn't as large as the trade had anticipated, and orders are being quickly filled. No. 1 heavy melting is now quoted $45-$46, brokers' buying price. Cast iron grades remain firm. Railroad scrap took the deepest cut, off $4 a ton. No. 1 R.R. heavy melting is quoted at $48-$49.

Buffalo—Scrap prices are down, with dealers awaiting placement of new mill orders. Leading steel grades are expected to sell $3 a ton under February levels. Blast furnace grades are off about $2 a ton; railroad items about $3, along with No. 1 machinery cast. No. 1 heavy melting is quoted nominally at $50-$51, with No. 2 heavy melting at $43-$44. Shipments to the Wickwire Spencer mill were shut off temporarily because of a wildcat strike that closed down the plant.

Birmingham—With prices continuing downward, the flow of scrap into dealers' yards appears to be drying up. The Atlanta mill purchased open-hearth scrap last week, its buy being limited to No. 2 heavy melting, for which it paid $41, delivered. The electric furnace grades are active, but specialty items are weaker. The cast iron market also is weak. Some improvement in export trade is noted.

Seattle—The general scrap market here is active, both in the domestic and export sections. Receipts are increasing with improved weather. Some prices have been revised as of Mar. 1. Bundles are off $1 to $3 and No. 1 cupola $2.

St. Louis—Scrap prices continue to sag, led by random length rails, which dropped $5 a ton to $57 last week. All railroad items but rerollers were marked down. Most melting steels, which declined a week ago, are holding. Weather and lower prices have prevented much scrap volume from coming to dealers' yards.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

12,000 tons, 30-story office building, Uris Bros., 2 Broadway, New York, to the Harris Structural Steel Co., New York; original inquiry called for 15,000 tons.

2465 tons, column cores and upper floor frames, 30-story office building, 720 Third Ave., New York, through the Turner Construction Co., New York, general contractor, to the Bethlehem Steel Co., Bethlehem, Pa.

1500 tons, state hospital, Embreeville, Pa., through the Turner Construction Co., Philadelphia, to Cantley & Co., Philadelphia.

1385 tons, 14-story office building, Maiden Lane and Gold street, New York, through John Lowery Inc., to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

1020 tons, intake screen frames, Washington Water Power Co., Koxon, Mont., through Ebasco Services Inc., to the Union Iron Works, Spokane, Wash.

800 tons, two high schools (junior and senior), Sunbury, Pa.; S. H. Everet, general contractor; to the Weatherley Steel Co., Weatherley, Pa.

500 tons, painting hangar for Boeing Airplane Co., Moses Lake, Wash., to the Northwest Steel Rolling Mills Inc., Seattle; Sound Construction & Engineering Co., Seattle, general contractor.

500 tons, state bridge work, contract FARC 56-105, Nassau county, New York, through Hendrickson Bros. Inc., general contractor, New York, to the Prospect Iron Works.

310 tons, transmission towers, New Jersey Power & Light Co., Asbury Park, N. J., to the Bethlehem Steel Co., Bethlehem, Pa.

210 tons, state bridge work, section FASH 57-1, Ulster county, New York, through John Arborio, general contractor, to the Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

6000 to 7000 tons, South street bridge (state), Harrisburg, Pa.; plans are expected to come out shortly.

4250 tons, Ft. Pitt tunnel, Pittsburgh; Merritt, Chapman & Scott Corp., New York.

1356 tons, superstructure of bridge, T-2-6, Northern Illinois toll highway contract ST-2, Robbins and Alsip, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar. 28.

1135 tons, drainage and structures, contracts T-2C and T-3B, Northern Illinois toll highway; bids Mar. 21, Chicago.

450 tons, Warrior River high school, Watsontown, Pa.; bids asked.

250 tons, also 325 tons of reinforcing bars and 250 tons of plates, Helena Valley irrigation project, Montana; Misco West Coast Co., Seattle, low at $1,056,383 to the Bureau of Reclamation on rebids.

242 tons, if monolithic concrete is adopted, 0.7 mile, 84-in. siphon, Helena Valley irriga-

(*Please turn to page* 255)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Mar. 6, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 6	$51.67
Feb. 27	52.50
Feb. Avg.	53.41
Mar. 1956	50.21
Mar. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*44.00-45.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*42.00-43.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	*36.00-37.00*
Mixed borings, turnings	*36.00-37.00*
Short shovel turnings	*40.00-41.00*
Cast iron borings	*40.00-41.00*
Cut structurals, 3 ft. lengths	*56.00-57.00*
Cut structurals, 2 ft. and under	*58.00-59.00*
Heavy turnings	*45.00-46.00*
Punchings & plate scrap	*56.00-57.00*
Electric furnace bundles	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	47.00-48.00
Unstripped motor blocks	38.00-39.00
No. 1 machinery cast	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	*55.00-56.00*
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	69.00-70.00
Railroad specialties	*67.00-68.00*

Stainless Steel Scrap

18-8 bundles & solids	500.00-540.00
18-8 turnings	420.00-440.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*29.00-30.00*
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Cut foundry steel	*51.00-52.00*
Cut structurals, plates 2 ft and under	*55.00-56.00*
Alloy free, short shovel turnings	*36.00-37.00*
Electric furnace bundles	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	52.00-53.00
Charging box cast	41.00-42.00
Heavy breakable cast	41.00-42.00
Stove plate	48.00-49.00
Unstripped motor blocks	34.00-35.00
Brake shoes	41.00-42.00
Clean auto cast	51.00-52.00
Burnt cast	39.00-40.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	*49.00-50.00*
R.R. malleable	*57.00-58.00*
Rails, 2 ft and under	*70.00-71.00*
Rails, 18 in. and under	*71.00-72.00*
Rails, random lengths	*65.00-66.00*
Cast steel	*59.00-60.00*
Railroad specialties	*63.00-64.00*
Uncut tires	*62.00-63.00*
Angles, splice bars	*62.00-63.00*
Rails, rerolling	*71.00-72.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-475.00
18-8 turnings	290.00-300.00
430 clips, bundles, solids	*85.00-90.00*
430 turnings	*35.00-40.00*

YOUNGSTOWN

No. 1 heavy melting	*48.00-49.00*
No. 2 heavy melting	*45.00-46.00*
No. 1 bundles	*48.00-49.00*
No. 2 bundles	40.00-41.00
No. 1 busheling	*48.00-49.00*
Machine shop turnings	*28.00-29.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Low phos.	*50.00-51.00*
Electric furnace bundles	*50.00-51.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00-53.00*

CHICAGO

No. 1 hvy melt, indus.	49.00-50.00
No. 1 hvy melt, dealer	45.00-46.00
No. 2 heavy melting	42.00-43.00
No. 1 factory bundles	50.00-51.00
No. 1 dealer bundles	46.00-47.00
No. 2 bundles	39.00-40.00
No. 1 busheling, indus.	49.00-50.00
No. 1 busheling, dealer	45.00-46.00
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	*35.00-36.00*
Short shovel turnings	*35.00-36.00*
Cast iron borings	*35.00-36.00*
Cut structurals, 3 ft	54.00-55.00
Punchings & plate scrap	55.00-56.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	41.00-42.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	50.00-51.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00-52.00*
R.R. malleable	*59.00-60.00*
Rails, 2 ft and under	*64.00-65.00*
Rails, 18 in. and under	*65.00-66.00*
Angles, splice bars	*57.00-58.00*
Rails, rerolling	*60.00-62.00*

Stainless Steel Scrap

18-8 bundles & solids	500.00-510.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	65.00-70.00

DETROIT

(Brokers' buying prices; f.ob. shipping point)

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	42.00-43.00
No. 2 bundles	31.00-32.00
No. 1 busheling	42.00-43.00
Machine shop turnings	26.00-28.00
Mixed borings, turnings	27.00-29.00
Short shovel turnings	28.00-29.00
Punchings & plate scrap	54.00-55.00

Cast Iron Grades

No. 1 cupola	*48.00*
Charging box cast	*43.00*
Stove plate	*45.00*
Heavy breakable	*41.00*
Unstripped motor blocks	*29.00*
Clean auto cast	*52.00*
Malleable	*53.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	45.50
No. 2 heavy melting	43.00
No. 1 bundles	45.50
No. 2 bundles	37.00
No. 1 busheling	45.50
Machine shop turnings	34.50
Short shovel turnings	36.50

Cast Iron Grades

No. 1 cupola	*45.50*
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	45.00
Clean auto cast	49.50
Stove plate	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00*
Rails, 18 in. and under	*64.00*
Rails, rerolling	63.00
Rails, random lengths	*57.00*
Angles, splice bars	*62.00*

PHILADELPHIA

No. 1 heavy melting	*56.00*
No. 2 heavy melting	*47.50*
No. 1 bundles	*56.00*
No. 2 bundles	*46.00*
No. 1 busheling	*56.00*
Electric furnace bundles	60.00
Mixed borings, turnings	44.00
Short shovel turnings	46.00-47.00
Machine shop turnings	42.00-43.00
Heavy turnings	*52.00*
Structurals & plate	*61.00-62.00*
Couplers, springs, wheels	69.00-70.00
Rails, crops, 2 ft & under	78.00-80.00

Cast Iron Grades

No. 1 cupola	51.00-53.00
Heavy breakable cast	57.00-59.00
Malleable	66.00†
Drop broken machinery	58.00-59.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*37.00-38.00*
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	*32.00-34.00*
Short shovel turnings	36.00-37.00
Low phos. (structurals & plate)	55.00-56.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Unstripped motor blocks	*35.00-36.00*
Heavy breakable	48.00-49.00

Stainless Steel

18-8 sheets, clips solids	475.00-485.00
18-8 borings, turnings	345.00-370.00
430 sheets, clips, solids	105.00-110.00
410 sheets, clips, solids	95.00-100.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*46.00-46.50*
No. 2 heavy melting	36.00-36.50
No. 1 bundles	*46.00-46.50*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*46.00-46.50*
Machine shop turnings	*30.00-30.50*
Mixed borings, turnings	31.00-32.00
Short shovel turnings	*32.00-33.00*
No. 1 cast	41.00-42.00
Mixed cupola cast	40.00-41.00
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*39.00-40.00*
No. 1 busheling	*50.00-51.00*
Mixed borings, turnings	*34.00-35.00*
Machine shop turnings	*31.00-32.00*
Short shovel turnings	*35.00-36.00*
Cast iron borings	*34.00-35.00*
Low phos.	*53.00-54.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	*50.00-51.00*

Railroad Scrap

Rails, random lengths	*59.00-60.00*
Rails, 3 ft and under	*64.00-65.00*
Railroad specialties	*54.00-55.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	*32.50-33.50*
Mixed borings, turnings	*32.50-33.50*
Short shovel turnings	*35.00-36.00*
Cast iron borings	*31.50-32.50*
Low phos. 18 in.	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00-49.00*
Rails, 18 in. and under	*69.00-70.00*
Rails, random lengths	*59.00-60.00*

BIRMINGHAM

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling	*42.00-43.00*
Cast iron borings	26.00-27.00
Short shovel turnings	36.00-37.00
Machine shop turnings	34.00-35.00
Bar crops and plate	*54.00-55.00*
Structurals & plate	*53.00-54.00*
Electric furnace bundles	50.00-51.00
Electric furnace, 2 ft & under	48.00-49.00

(F.o.b. shipping point)

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	50.00-51.00
Unstripped motor blocks	*41.00-42.00*
Charging box cast	40.00-41.00
No. 1 wheels	*38.00-39.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 18-in. and under	*61.00-62.00*
Rails, rerolling	*62.00-63.00*
Rails, random lengths	*58.00-59.00*
Angles, splice bars	58.00-59.00

SEATTLE

No. 1 heavy melting	53.00
No. 2 heavy melting	*48.00*
No. 1 bundles	*48.00*
No. 2 bundles	*30.00-32.00*
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	*52.00-54.00*
Heavy breakable cast	48.00-50.00
Unstripped motor blocks	*40.00-42.00*
Stove plate (f.o.b. plant)	42.00-43.00

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	51.00
No. 1 bundles	54.00
No. 2 bundles	36.00
Machine shop turnings	34.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	55.00
No. 2 heavy melting	50.00
No. 1 bundles	54.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	50.00
Drop broken machinery	62.00

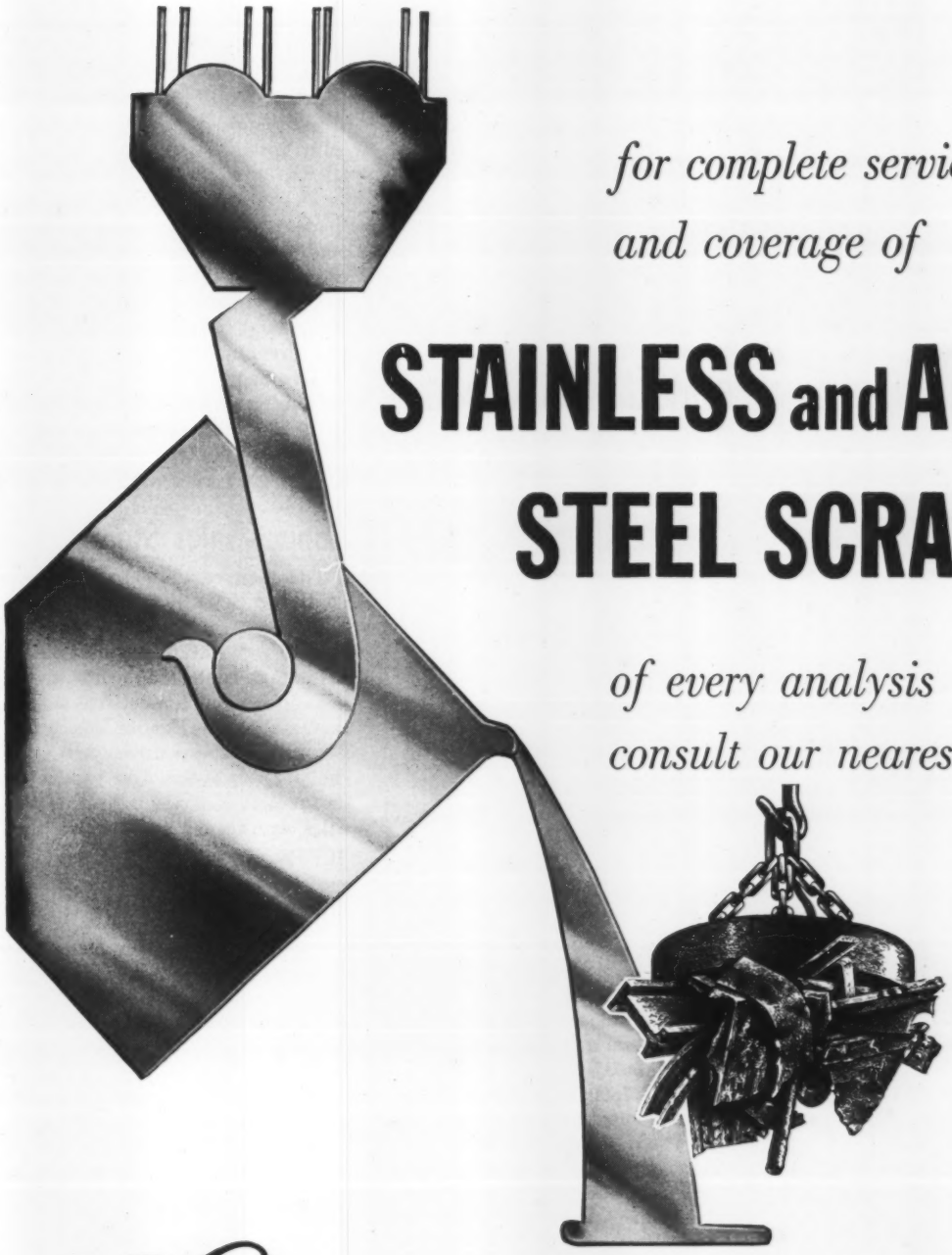
HAMILTON, ONT.

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*43.00*
No. 1 bundles	*48.00*
No. 2 bundles	*37.00*
Mixed steel scrap	*40.00*
Mixed borings, turnings	*24.00*
Busheling, new factory: Prepared	*46.00*
Unprepared	*42.00*
Short steel turnings	*33.00*
Rails, rerolling	*54.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.



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IMPORT & EXPORT – **LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

Nicaro Up for Sale?

U.S. nickel producing facility in Cuba will not be sold quickly. Congress may be asked to approve the purchase to prevent any Monday morning quarterbacking

Nonferrous Metal Prices, Pages 254 & 255

RUMORS, some originating with the help of the General Services Administration, have it that the Nicaro nickel producing facilities will be "put up for grabs" at mid-year.

While the operation should be producing at an annual rate of some 25,000 tons of nickel powder and sinter, look for GSA to move slowly.

Reasons — 1. Congressmen will be watching the sale closely. 2. The importance of nickel as a defense metal may dictate that final decision on a sale be approved by Congress, the secretary of defense, the President—or all three. 3. Sufficient operating data on the expanded facilities are not available. 4. Competitive bidding will be a must.

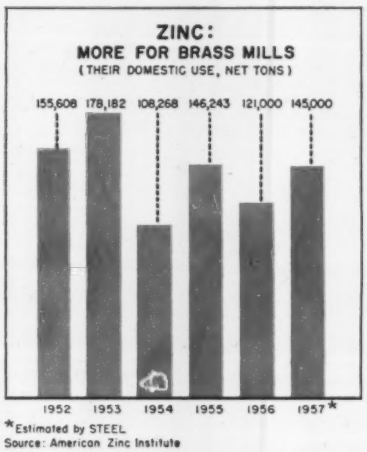
Outlook: The Business & Defense Services Administration and the Office of Defense Mobilization will hesitate to make a decision which could boomerang after Congress digests the results. The job of approving the sale will be turned over to the highest possible government echelons. Look for National Lead Co.'s subsidiary (Nickel Processing Corp.) to continue the operation of the facility on a month-by-month basis after its contract expires in June.

U. S. Purchases Dip

Government purchases of lead and zinc for strategic stockpile may be waning. The program will run out of money in June. The U.S. has committed itself to continue the barter program (excess foreign lead and zinc are exchanged for surplus domestic foodstuffs) until June 30, 1958. Owing to domestic pressure for some type of assistance program, look for the U.S. to reach a compromise between mine state congressmen and economy-minded appropriations committees.

Battle Line: Mag vs. Sodium

Sodium reduction of zirconium and titanium is growing. Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., is using sodium at its titanium works in Ashtabula, O. (Its annual capacity is 7500 tons.) U.S. Industrial Chemicals Co. plans to produce titanium and zirconium by a sodium reduction process. On Mar. 1, Allied Chemical & Dye Corp. and Kennecott Copper Corp. announced a $40-million venture into the titanium field. The new firm, Allied-Kennecott Titanium Corp., will produce titanium chloride, sponge and billets. While the official announcement has not been made, it's almost certain that a continuous sodium reduction process will be used. The Kroll magnesium reduction process is still being used for aluminum, titanium and zirconium, but the lines of battle are being drawn. Users of the sodium process will be out to prove that titanium and zirconium (perhaps other nonferrous metals) can be produced cheaper their way.



Copper Sales Steady

The "immediate delivery" trend continues. While brass mills are not ordering spectacular tonnages, they are requesting rush orders. Wire and cable shipments are at peak levels, but competitive bidding is taking a portion of the profit. Copper sales executives are eying the jump in automotive production as the first concrete indication that sales are headed for a substantial upturn.

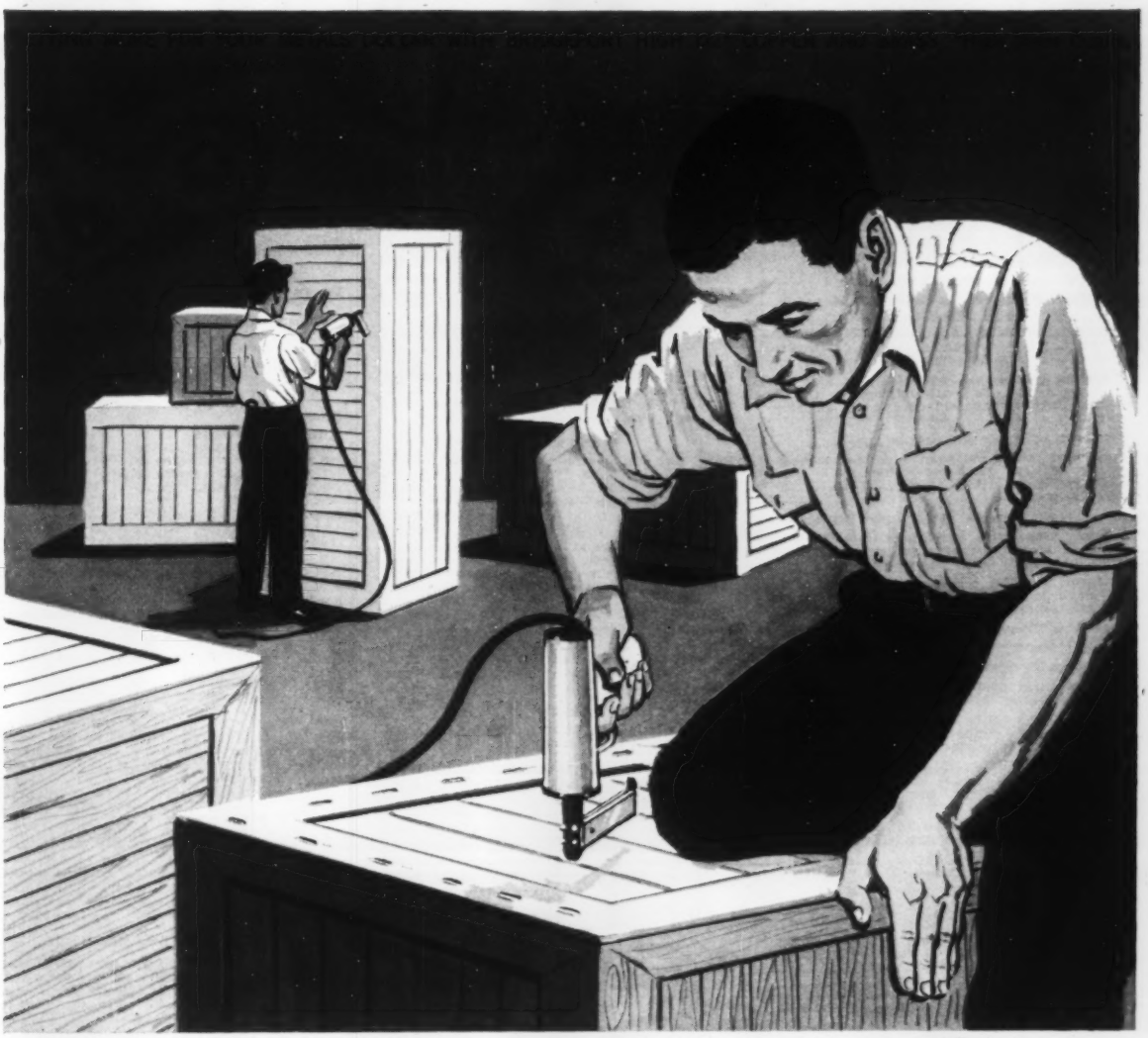
Aluminum Perks Up

Competition is razor sharp, but aluminum sales are showing an upturn. Some prices are being shaded, but industry observers point out that if present trends continue, there will be little price cutting after the first quarter. Points out one producer: "We are all going to have to learn that having an extra 5 to 10 per cent available does not call for us to go out and slash prices."

NONFERROUS PRICE RECORD

	Price Mar. 6	Last Change	Previous Price	Feb. Avg.	Jan. Avg.	Mar., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.650
Copper	31.00–32.00	Feb. 19, 1957	31.00–34.00	32.863	35.433	49.727
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	74.000	70.880	64.500
Tin	99.25	Mar. 5, 1957	98.875	101.159	101.480	100.606
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.



BRIDGEPORT BRONZE AND BRASS:

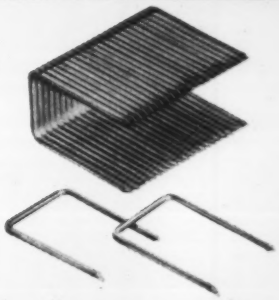
Best "Ammunition" For Stapling Gun

California Wire Products Company, Inc., Visalia, California, manufactures air-operated staplers for a variety of crating and assembly applications; wood-to-wood, sheet metal to wood, roofing, wall paneling, etc. Often, many of these applications are subject to fresh and salt water corrosive attack.

Solving both corrosion problems required two Bridgeport alloys with suitable anti-corrosive properties and workability. Calwire's staple-cutting and forming machines are specially designed, and "alloy adaptability" to their production methods is a prime factor.

Bridgeport Yellow Brass Wire #16 with a tensile strength of 65,000 to 80,000 psi in diameters of .0625" and .080" is used for staples that must withstand fresh-water corrosion. Bridgeport Duronze #609 (Silicon Bronze) Wire with a psi of 80,000 to 100,000 and diameters of .0625" and .080" is used when salt-water corrosion is present.

This is another example of how Bridgeport meets specific problems—unique and common—with one or more of its long list of *standard* alloys. Call your nearest Bridgeport Sales Office today—there's one near you.



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Bridgeport Brass Company, Bridgeport 2, Connecticut
In Canada: Noranda Copper and Brass Ltd., Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.00 deld; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $92-$95 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 99.25; prompt, 98.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-2 (0.5% Fe max), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.20 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50 deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.50-29.25; No. 12 foundry alloy (No. 2 grade), 22.25-23.50; 5% silicon alloy, 0.60 Cu max, 24.50-26.00; 13 alloy, 0.60 Cu max, 24.50-26.00; 195 alloy, 24.25-26.75; 108 alloy, 22.25-23.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.50; grade 2, 21.75; grade 3, 20.75; grade 4, 20.00.

Brass Ingot: Red brass No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.00; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 28.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	.....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam.,(in.)or across flats	—Round— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)
Aluminum: 1100 clippings, 13.00-13.50; old sheets, 8.00-8.50; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	37.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.08	51.08	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcases, 8.00-8.50; industrial castings, 8.00-8.50.

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 22.00-22.50; light copper, 19.50-20.00; No. 1 composition red brass, 20.00-20.50; No. 1 composition turnings, 19.00-19.50; yellow brass turnings, 12.00-12.25; new brass clippings, 18.50-19.00; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.00-16.50; brass pipe, 16.75-17.25.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 70.00-85.00; old sheets, 65.00-80.00; turnings, 55.00-75.00; rods, 70.00-90.00.

Nickel: Sheets and clips, 140.00-185.00; rolled anodes, 140.00-185.00; turnings, 125.00-160.00; rod ends, 140.00-185.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound carlots, delivered refinery)

Aluminum: 1100 clippings, 17.50; 3003 clippings, 17.50; 6151 clippings, 17.50; 5052 clippings, 17.00-17.50; 2014 clippings, 16.50-17.00; 2017 clippings, 16.50-17.00; 2024 clippings, 16.50-17.00; mixed clippings, 16.50; old sheets, 14.50; old cast, 14.50; clean old cable (free of steel), 16.50-17.50; borings and turnings, 14.50-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 25.00; light copper, 22.75; refinery brass (60% copper) per dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 17.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (anhydrous): Less than 25 lb, 167.70; 25 lb, 132.70; 100 lb, 117.70; 400 lb, 115.30; 5200-19,600 lb, 103.10; 20,000 lb, 90.90.

Stannous Sulphate: Less than 50 lb, 130.40; 50 lb, 100.40; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(Concluded from page 249)

tion project; bids to the Bureau of Reclamation, Helena, Mont., Mar. 28.

250 tons, high school, Berwick, Pa.; Ralph H. Woelful is low on the general contract.

200 tons, alterations, Betts Ave. incinerator, Queens, Department of Public Works, New York; bids Mar. 13.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Union Pacific, fifteen 8500-hp gas turbine-electric units to the General Electric Co., Schenectady, N. Y.

Delaware, Lackawanna & Western, eight 1200-hp diesel-electric switching units, to the Electro-Motive Division, General Motors Corp., La Grange, Ill.

Colorado & Wyoming, one 900-hp diesel-electric switching unit, to the Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Bangor & Aroostook, 400 fifty-ton boxcars, to ACF Industries Inc., New York.

Chicago, Rock Island & Pacific, ten aluminum refrigerator car units, to ACF Industries Inc., New York.

Erie, 100 seventy-ton covered hoppers, to the Greenville Steel Car Co., Greenville, Pa.

Texas & Pacific, 230 freight cars to its own shops; list comprises 100 seventy-ton gondolas, and 30 seventy-ton covered hoppers, 75 fifty-ton boxcars and 25 fifty-ton refrigerator cars.

Wilson Car Lines, 200 forty-ton refrigerator cars, to the Pacific Car & Foundry Co., Renton, Wash.

Atchison, Topeka & Santa Fe, 15 baggage cars, to the Budd Co., Philadelphia.

Northern Pacific, six dining cars and two vista dome coaches, to the Budd Co., Philadelphia.

Chicago, Burlington & Quincy, 1985 freight cars, to its own shops; included are 1525 fifty-ton boxcars, 410 seventy-ton covered hoppers, and 50 seventy-ton gondolas.

Union Tank Car Co., 918 tankcars; to its own shops; included are: eight-hundred 11,000-gal, fifty-six 10,600-gal, fifty 10,000-gal, one 6000-gal, and eleven 4000-gal cars.

Alaska Railway, General Services Administration, Seattle, 50 seventy-ton triple nopper cars; bids Mar. 25.

CLASSIFIED

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For Structural Steel Fabrication in good California city, with minimum of ten years experience detailing, checking, scheduling, supervision. Permanent, interesting work for competent, dependable men. Salary $750.00 and $600.00 a month to start, plus bonus. Please send resume of experience, education, references. Box 520, STEEL, Penton Bldg., Cleveland 13, Ohio. Will consider application through Employment Exchange.

WANTED: METALLURGIST FOR NEW ENGLAND foundry producing carbon low alloy and stainless steel castings. Should be metallurgical graduate with technical ability direct laboratory and melting furnaces. Submit resume giving experience, education, age, and salary expected. Reply Box 528, STEEL, Penton Bldg., Cleveland 13, Ohio.

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PRODUCTION ENGINEER:—Progressive & deep draw specialist. If you want experience & knowledge for applying it, I'm your man. Age 47. Box 527, STEEL, Penton Bldg., Cleveland 13, Ohio.

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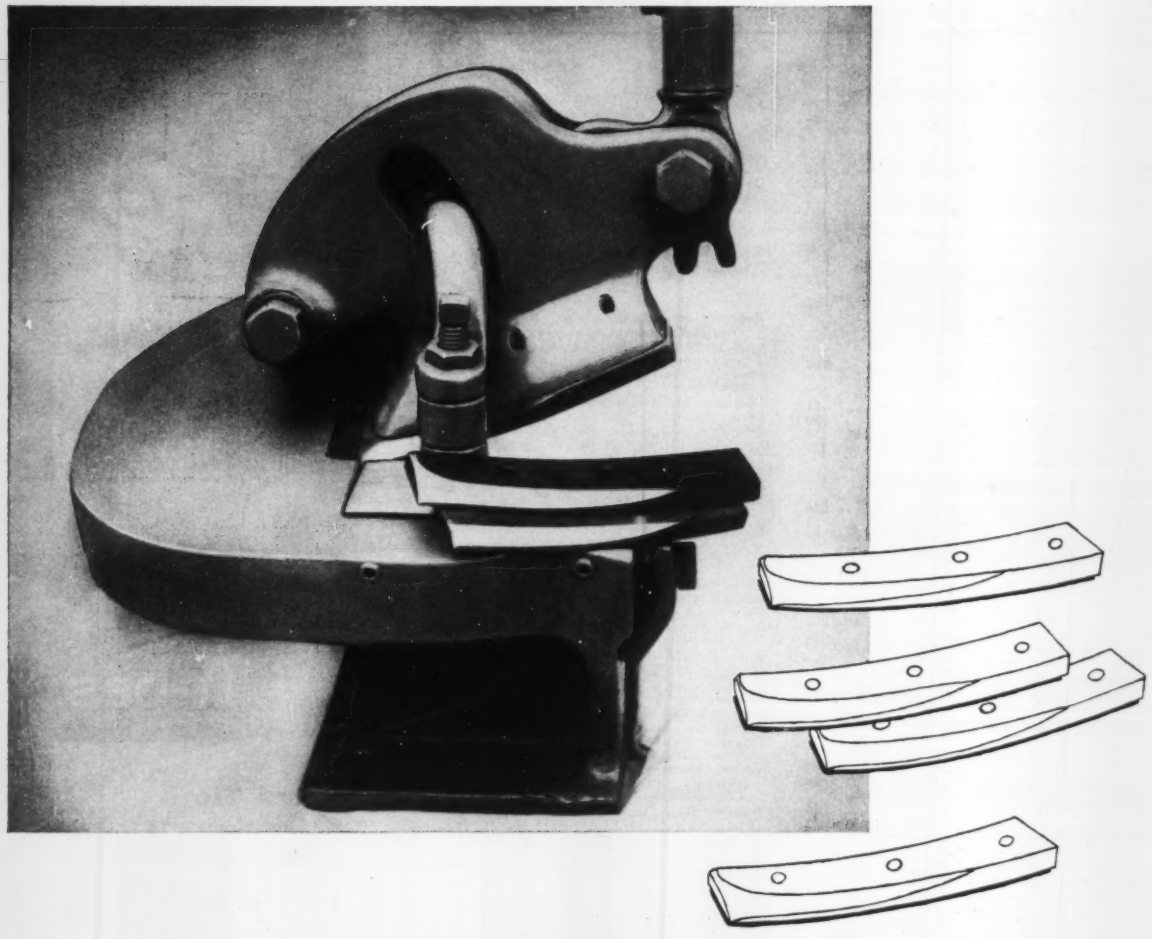

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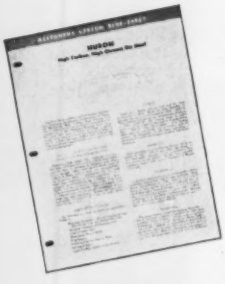

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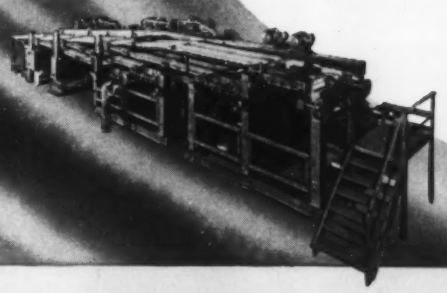

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